British Society of Prosthodontics
Annual Conference 2024

bsspd

Prosthodontics at the Interface - Art & Science

Thursday 18th & Friday 19th April
Royal Welsh College of Music & Drama, Cardiff

British Society of Prosthodontics | www.bsspd.org
Fixed - Removable - Implant - Maxillofacial

Croeso! Welcome!

I am delighted to welcome you all to the 70th Anniversary BSSPD Conference in Cardiff. We have a wonderful venue at The Royal Welsh College of Music and Drama right in the heart of Cardiff the Capital City of Wales. Cardiff is a young, vibrant, cosmopolitan hub where the historic Castle and Museums sit alongside state-of-the-art sport, retail, and hospitality facilities. The main city centre spreads down to the new Cardiff Bay development created around the old historic Tiger Bay docks and now a centre of hospitality and recreation. It is also home to the Welsh Parliament (Senedd) and The Millennium Centre Theatre.

The Conference venue is the newly developed home to the world-famous Royal Welsh College of Music and Drama next door to The Castle. The college houses 2 full size concert theatres that can seat up to 400 and 200 delegates respectively. There are large atria for catering, trade show and prize presentations. There are onsite bar and catering facilities and the building has a large terrace that looks out over the beautiful Bute Park and River Taf.

The theme of the Conference is ‘Prosthodontics at the Interface - Art and Science’ and we have assembled a fantastic line up of speakers from across the UK and Europe to address the Conference theme in both breadth and depth. We will look at the many interfaces of Prosthodontic treatment and technologies. On day one after Professor Tim Newton has set the scene looking at how patient psychology often determines outcomes, Dr George Michelinakis gives the first of his 2-part presentation on the role of digital technologies in delivering precision prosthodontics. Professor Wendy Turner will give the first of the dental specialties interfaces when she looks at how prosthodontic and periodontal planning go hand in hand. After lunch we look at how prosthodontics interfaces with multidisciplinary team work to facilitate patient rehabilitation. Dr Matthew Thomas looks at options for hypodontia patients, Dr James Darcey will take us through trauma treatment options, while the session ends with Dr Nathalie Vosselman looking at complex surgical oncology oral rehabilitation .

The close of day one will be followed by the AGM and launch of our BSSPD@70 book that looks back at the history of the first 70 years of the Society. This will lead straight into the evening Social Event with an informal food and drinks reception in the conference venue with musical entertainment in the form of the Cardiff Male Voice Choir and a Jazz Trio laid on by The Welsh College of Music. Feel free to mingle with other delegates and the trade show both inside and out onto the terrace (weather permitting) while enjoying the refreshments and light musical entertainment. Following this the adventurous may wish to explore the nightlife of Cardiff a short stroll away in the city centre!

Day two begins with an in-depth session on the ‘Art and Science’ of removable prosthodontics. Drs Finlay Sutton, Charlotte Stilwell and Mike Gregory will look at

how Hygienic Scandinavian design, strategic single implant placement and sound impression technique can all transform removable prosthodontic outcomes. The session will also see the awarding of the Schottlander Research prize and the presentation of the winning project.

Following lunch on day two the final session again looks at our prosthodontic interfaces. Professor Shakeel Shadad looks at how prosthodontic principles drive implant success and Dr Massimo Giovarruscio looks at how loss of vitality, root canal therapy and sustainable restorations are related. Dr Michelinakis also gives the second part of his comprehensive digital prosthodontic perspective.

If that was not enough on day two there will also be a parallel session run by the Institute of Maxillo-Facial Technologists and our Dental Technologist colleagues to give further educational options. Delegates will be free to choose between either session for talks they find most relevant to them.

A packed programme both educationally and socially and one not to be missed – A very warm welcome to you and enjoy Cardiff and the conference.

James Owens
President, BSSPD 2023-24

Contents

Conference programme

The Venue

The Royal Welsh College of Music & Drama hosts a stunning suite of conference venues including the Dora Stoutzker Concert Hall (seating up to 350 delegates), the Richard Burton Theatre (up to 180 delegates), 12 light-filled breakout rooms, a versatile exhibition gallery and the contemporary glass Carne Foyer. There is a café, bar and open-air terrace overlooking the beautiful parks surrounding Cardiff Castle.

Parallel sessions

We are pleased to have parallel lecture sessions running on Friday 19th April. These are available for any of our delegates to attend, not just IMPT/dental technologists.

Group meetings

On day one of the Conference there will be a meeting of the Prosthodontic Curriculum Group and Dental Technologists Group organised by Prof. James Field. Times to be confirmed.

Wifi

Option 1. The Cloud (powered by Sky)

a) Check your wifi is on.
b) Select 'The Cloud' from the available network list.
c) Open browser and follow on-screen instructions to register or log on.
d) Once you have registered, you will seamlessly connect to 'The Cloud' without needing to re-enter your username and password.

The Cloud is available to anyone who has a 'The Cloud' account. If you do not have one, you can create an account, free of charge, as described above.

Option 2. Eduroam

If your employer runs an 'eduroam' network you can connect to the eduroam WiFi network here at the Royal Welsh College of Music and Drama using your employee email address and password. Simply select 'eduroam' from the list of available networks and sign in with your credentials.

Instructions for poster presenters...

If you are presenting a poster please note that this will need to be put up on your allocated poster space at the conference venue by 10:00 on Thursday. You are asked to stand by your posters at the allotted time to answer questions from the delegates and judges. The posters do not need to be removed until Friday afternoon.

Thursday 18th April

08:15	Registration & coffee / trade show
09:00	**Welcome and opening address**
	[Session 1: Chair Dr Matthew Locke]
09:15	**The interface between Psychology and Prosthodontics** Professor Tim Newton
10:00	**The Prosthodontic Digital Interface – How modern technology produces precision prosthetics Part 1 Fixed prosthodontics** Dr George Michelinakis
11:00	Coffee, posters and trade
11:30	**The Periodontic Prosthodontics Interface: The challenges and impact of periodontitis** Professor Wendy Turner
12:15	Session 1 Plenary
12:30	Lunch, trade and Schottlander poster viewing
	[Session 2: Chair Dr Sarra Jawad] **Prosthodontics in the multidisciplinary team**
13:30	**Hypodontia - Prosthodontic considerations for multidisciplinary cases** Dr Matthew Thomas
14:15	**The prosthodontic approach to dental trauma - replacing and repairing damaged dental tissues** Dr James Darcey
15:00	Coffee, posters and trade
15:30	**The prosthodontic oncology interface - Prosthetic rehabilitation following resective head and neck cancer surgery** Dr Nathalie Vosselman
16:15	Session 2 Plenary
16:30	**BSSPD research award announcement** - Prof Gerry McKenna
16:45	**BSSPD AGM and launch of BSSPD at 70 book** (ends at 17:30)
17:45	**Drink and canape reception with musical entertainment** Royal Welsh College of Music and Drama atrium

Conference programme

Friday 19th April

08:15	Registration and coffee / trade show
	[Session 3: Chair Dr Elizabeth King] **The Art and Science of Removable Prosthodontics**
09:00	**Evolution of RPDs as a versatile prosthodontic option: hygienic Scandinavian Design, strategic use of Single Implant Abutments, Future Proofing approach** Dr Charlotte Stilwell
09:50	**The engineering advantages of the Scandinavian Hygienic RPD approach over classic British/American teachings in challenging prosthodontic cases** Dr Finlay Sutton (this talk is sponsored by Schottlander)
10:45	Coffee, posters and trade
11:15	**Impression technique - the foundation for successful prosthetics** Dr Michael Gregory
12:00	Session 3 plenary
12:15	**Award announcements and Schottlander winning prize award and project presentation**
12:45-13:45	Lunch and Trade
	[Session 4: Chair Dr Liam Addy]
13:45	**Digital Prosthodontics Part 2: The role of digital technology in removable prosthodontics** Dr George Michelinakis
14:30	**The Prosthodontic - Implant interface - How prosthetic principles drive implant success** Professor Shakeel Shahdad
15:15	Coffee, trade and posters
15.45	**The Endodontic Prosthodontics Interface. From the canal to the crown. Clinical options for daily practice** Dr Massimo Giovarruscio
16:30	Session 4 plenary
16:45	**Handover to new president Dr Shiyana Eliyas**
17:00	Close

Friday 19th April - IMPT

08:45	**Welcome** – Mr Peter Evans
	[Session 1: Chair Mr Peter Evans]
09:00	**The Design and use of 3D printed surgical guides for oncology zygomatic implants** Dr Nathalie Vosselman
09:45	**Nasal Rehabilitation with Zygomatic Implants; supporting the patient** Mr Lawrence Dovgalski
10:05	**Oro-facial cases - Joint working** Mr Garry Jones
10:15	**Q and A**
10:45	Coffee, Posters and Trade
11:15	**Our journey into jaw-in-a-day** Prof Chris Butterworth and Taran Malhotra
11:45	**Obturation…the last resort** Mr Barry Edwards
12:05	**TBC**
12:30	**Q and A**
12:45	Lunch and Trade
	[Session 2: Chair Mr Steven Hollisey-McLean]
13:45	**An Introduction to Maxillofacial Prosthetics& Reconstructive Science** Mr Stefan Edmondson
14:30	**Opportunities and Challenges in Digital Prosthetics and Implant Design** Prof Dominic Eggbeer
15:15	Coffee, trade and posters
15:45	**Smile design: How an art is being transformed by science and technology** Dr Raelene Sambrook
16:30	**Q and A**
17:00	Close

Invited speakers

We are delighted to have a number of renowned specialists in the area of prosthodontics speaking at our 70th annual conference in Cardiff.

Prof. Tim Newton

The interface between Psychology and Prosthodontics.

Tim Newton is a Psychologist who has spent over 30 years working in dental settings with the goal of ensuring that everyone has the opportunity to enjoy the benefits of good oral and dental health. He is particularly concerned with addressing the needs of people who are anxious about attending the dentist, and in encouraging dental healthcare professionals to work with patients to develop healthy behaviours. As part of this he has undertaken extensive work supporting the well being of the dental team.

Tim is employed by King's College London as Professor of Psychology as Applied to Dentistry, spending half his time working as Honorary Consultant Health Psychologist. Tim's clinical work is focussed on individuals with dental phobia, and support for individual's facing challenging dental procedures.

Dr George Michelinakis

The Prosthodontic Digital Interface – How modern technology produces precision prosthetics Part 1 Fixed prosthodontics

Digital Prosthodontics Part 2: The role of digital technology in removable prosthodontics

George was born in Heraklion, Crete. He was awarded the Degree in Dental Science (DDS) by the National and Kapodistrian University of Athens, Faculty of Dentistry in 1999.He completed his 3-year training programme in the specialty of Prosthodontics at the University of Manchester Dental School and Hospital UK (2001-2004) and was awarded an MSc in Fixed and Removable Prosthodontics (2003) and an MPhil in Fixed and Removable Prosthodontics (2005) by the same University. Since 2004, he maintains a private practice in Heraklion, Crete, Greece specializing in Prosthodontics and Implant Dentistry.

He has published in both English and Greek dental journals, authored a chapter in a book published by Quintessence and has lectured in numerous national and international conferences. George also serves as a reviewer for acclaimed

prosthodontic journals. He is currently an active member of the International Team for implantology (ITI) and the Greek Prosthodontic Society and a fellow of the European Prosthodontic Association (EPA).

In 2003, George started working on the development of the Implant Recognition System© (IRS), a searchable database designed to simplify clinicians and technicians task when identifying a dental implant system. IRS won third place in the 2008 NHS North West Innovation Awards.

George is a recognised specialist in Prosthodontics by the European Prosthodontic Association (www.epadental.org) and a registered speaker for the International Team for Implantology (ITI). He is also a Key Opinion Leader (KOL) for 3Shape and Ackuretta.

Prof. Wendy Turner

The periodontic Prosthodontics Interface: The challenges and impact of periodontitis

Wendy Turner is the Director/Head of Dentistry at Queen's University Belfast, a role she took over in August 2023. She is a Clinical Professor and Consultant in Restorative Dentistry and previously worked at Barts and the London School of Medicine and Dentistry (QMUL) until 2017. Over the last 25 years she has been a full time clinical academic, with a focus and passion for dental education whilst, specialising clinically in Periodontology and Restorative Dentistry and has been Honorary Secretary for the BSP since 2021. Alongside dental education, her clinical and research interests have included the use of antimicrobials in periodontology, severe periodontal problems in children and the molecular pathways of bone formation. She has published a number of academic papers and textbooks in Periodontology.

Dr Matthew Thomas

Hypodontia - Prosthodontic considerations for multidisciplinary cases.

Originally from West Wales, Matthew graduated from the Dental School at the University of Wales College of Medicine in 2004 with Distinction. He was awarded academic prizes in every year of his degree, culminating in the DENTSPLY award for excellence for the highest overall examination mark.

He completed his specialist training in 2012 and is a registered specialist in Restorative Dentistry, Endodontics, Periodontitcs and Prosthodontics.

Dr Thomas serves as a Consultant in Restorative Dentistry and Oral Rehabilitation in South East Wales providing clinical services at Hospitals in Cardiff and Newport. He is the Clinical lead for Restorative Dentistry at the University Dental Hospital in Cardiff and an Honorary Senior Lecturer in Restorative Dentistry for the School of Dentistry, Cardiff University.

Dr Thomas performs dental rehabilitation of patients with Congenital Oral Anomalies (primarily Hypodontia) that have often been managed through a multidisciplinary team pathway. He also provides prosthetic rehabilitation for Oncology patients as part of the South East Wales Head and Neck Cancer MDT. He is an active Royal college of Surgeons examiner for over 12 years, most recently as a member of the ISFE examiner panel.

Dr James Darcey

The prosthodontic approach to dental trauma - replacing and repairing damaged dental tissues.

James's week is split between his role as a Consultant in Restorative Dentistry at the University Dental Hospital of Manchester and a Specialist in Endodontics and Restorative Dentistry at Clinic 334 in Wilmslow. In his hospital role he runs the emergency dental clinic and his clinical work largely focuses upon the acute and long term management of dental trauma. He led the development of the Saving Smiles trauma project in Greater Manchester and is chair of the Restorative MCN.

Dr Nathalie Vosselman - DDS

The prosthodontic oncology interface - Prosthetic rehabilitation following resective head and neck cancer surgery.

Nathalie Vosselman is Head of the Centre for Special Dental Care at the Department of Oral and Maxillofacial Surgery, University Medical Center Groningen (UMCG). She studied dentistry at the University of Amsterdam and graduated in 2003. She started her private dental practice in Haarlem in 2004 were she mainly provided complex restorative and prosthetic dental care for 16 years. Following completion

of her training in Maxillofacial Prosthodontics at the department of Oral and Maxillofacial Surgery in the UMCG she earned a staff position. As maxillofacial consultant for the Head and Neck Centre she primarily focuses on oral and facial rehabilitation and centered her PhD research on the subject of 3D workflows in prosthetic rehabilitation of Head and Neck oncology patients.

Dr Charlotte Stilwell

Evolution of RPDs as a versatile prosthodontic option: hygienic Scandinavian Design, strategic use of Single Implant Abutments, Future Proofing approach.

Charlotte Stilwell is a specialist prosthodontist in private practice in Harley Street, London. She trained at the Royal Dental College in Copenhagen, Denmark followed by post-graduate training and part-time lecturer post at Barts and The London School of Medicine and Dentistry.

Charlotte is currently international president of the ITI International Team for Implantology, senior lecturer at University Clinic of Dentistry, Geneva and an examiner for the Royal College of Surgeons of Edinburgh.

Dr Finlay Sutton

The engineering advantages of the Scandinavian Hygienic RPD approach over classic British/American teachings in challenging prosthodontic cases.

Finlay is based in Garstang (North West England) limiting his clinical work to removable prosthodontics. Together with his highly skilled dental technician (Rowan Garstang), working in the room next door, they provide superbly functioning and life-like dentures profoundly improving their patients' quality of life.

Finlay loves teaching dental professionals how to provide state of the art dentures, aiming to ignite enthusiasm for removable prosthodontics.

Finlay qualified in 1993 and spent 6 years in general practice, during this time he found prosthodontics unpredictable and as a result stressful. This led him to leave general practice and gain a further 7 years formal training in prosthodontics and restorative dentistry at Manchester and Liverpool dental hospitals prior to establishing his specialist referral practice in 2007.

Finlay concentrates his professional life within three areas of removable prosthodontics, namely; 1. clinical provision for patients, 2. training/lecturing/ mentorship for dental professionals, 3. research and development.

Dr Mike Gregory

Impression technique - the foundation for successful prosthetics: Mere Mortals can take amazing impressions.

Dr Mike Gregory is relatively unique in being qualified as a dental technician and a Dental Surgeon and has been teaching removable prosthetics since 1980. Since 1993 he's been a part clinic lecturer at Bristol University Dental School. In addition, he lectures at a postgraduate level on a number of the Foundation Dental Schemes in the South West and Wales, for Health Education England and Health Education in Wales as well as running a number of courses each year for The English Southwest Postgraduate Deanery.

He also practices part time in general practice restricted to Removable Prosthodontics.

Prof. Shakeel Shahdad

The Prosthodontic - Implant interface - How prosthetic principles drive implant success.

Shakeel Shahdad is a Consultant and Hon. Clinical Professor in Oral Rehabilitation & Implantology at The Royal London Dental Hospital, and Barts & The London School of Medicine and Dentistry. He is the Clinical Lead for Restorative Dentistry, Lead for postgraduate implant training and Chairman of ITI Scholarship Centre at QMUL. He is also leading the £2.3m Digital Dental Transformation Project at the hospital and school.

He is a Fellow of the International Team for Implantology. He is also the Chairman Emeritus for the Advisory Board in Implant Dentistry for the Royal College of Surgeons of Edinburgh and the ITI UK & Ireland Section. In 2017, he was conferred Fellowship of the Faculty of Dental Trainers (FFDTEd) by The Royal College of Surgeons of Edinburgh.

He is a specialist in Restorative Dentistry, Periodontics, Prosthodontics and Endodontics.

Apart from the specialist restorative treatment, his areas of particular interest include aesthetic implant dentistry and management of complex restorative cases including functional and aesthetic rehabilitation of patients with congenital absence of teeth and toothwear. Shak specialises in treating patients requiring complex and advanced restorative treatment including surgical placement and restoration with dental implants. He also runs a multi-specialist referral practice in the West End of London.

Prof. Massimo Giovarruscio

The Endodontic Prosthodontics Interface. From the canal to the crown. Clinical options for daily practice.

Prof. Massimo Giovarruscio is a highly skilled professional, with extensive experience in Endodontics, Restorative and Aesthetic Dentistry. With over 20 years' experience in dentistry, he has developed his reputation within the profession as an excellent endodontist, clinician and educator. He is accredited Specialist in Endodontics and he was a Clinical Teacher in Endodontics at King's College London Dental Institute to both Undergradute and Postgraduate students for more the 15 years. He works in Rome, Bristol and London, specialising in Endodontic Treatment and Restoration of Endodontically Treated Teeth and is regarded as an World Opinion Leader in Endodontics and restorative procedures related to the endodontically treated tooth. He lectures world-wide and has published many articles in International journals, and wrote several endodontic chapter and manuals recognized and used by the University.

IMPT speakers

Parallel session speakers

Mr Lawrence Dovgalski

Lawrence Dovgalski is a Maxillofacial Prosthetist with 18 years of experience working as part of the laboratory team at Morriston Hospital, Swansea. His areas of expertise include planning of osseointegrated implants for facial prosthetics, orthognathic surgical plans and digital reconstruction/guide design for complex free-flap cases.

Mr Garry Jones

Garry Jones is a highly skilled Dental Technician based at Morriston Hospital in Swansea, where he brings a wealth of expertise and dedication to the field of dental prosthetics. With a career spanning over three decades, Mr. Jones has become a cornerstone in the hospital's Maxillofacial department, known for his precision and commitment to providing quality dental solutions. Garry qualified with a Final Certification in Dental Technology City & Guilds in 1975 and joined running his own laboratory and joining the Morriston team, and becoming Head of Prosthetics in 2015.

Professor Chris Butterworth

Professor Chris Butterworth is a UK-based Maxillofacial Surgical Prosthodontist who has worked at University Hospital Aintree since his appointment in 2003. He has built an international reputation for innovative care in the field of oral & facial rehabilitation following head & neck cancer and has won several national and international awards for his work on implant-based prosthetic rehabilitation. He has pioneered the combination of skeletally anchored zygomatic implants in combination with microvascular free flap reconstruction for patients with maxillary and mid-facial malignant diseases (the ZIP Flap technique).

He is actively involved in research within the Head & Neck Centre and regularly lectures at national and international meetings. He was the youngest ever national president of the British Society of Prosthodontics in 2011/12. He organised the Zygomatic2019 conference in London in March 2019. Chris has authored over 60 scientific papers, several textbook chapters and is the lead author on the current restorative guidelines for UK based head & neck cancer patients.

Ms Taran Malhotra

Taran Malhotra holds an MSc in Maxillofacial Prosthetic Rehabilitation from Kings College London, complemented by clinical training at QE Hospital, Birmingham. Taran's expertise centres on 3D applications in Oral and Maxillofacial surgery planning and integrating digital technology into prosthetic rehabilitation. Pioneering the establishment of Aintree Hospital's 3D virtual surgical planning service in 2016, she remains dedicated to innovation and service development.

With over a decade of impactful contributions, Taran has been a prominent speaker at conferences, addressing complexities in facial prosthetics, 3D surgery planning for orthognathic surgery, and mandibular reconstructions using microvascular-free flaps.

In 2022, Taran was honoured with the NIHR Pre-doctoral Clinical and Practitioner Academic Fellowship (PCAF), marking her as the first in her speciality to receive this prestigious accolade. Her research endeavours now focus on developing a person-centred intervention to enhance the quality of life for individuals with head and neck cancer utilising facial prostheses.

Mr Barry Edwards

Barry Edwards started out as an apprentice dental technician in the late 1980s in his father's business, before running a dental laboratory for the next decade. He became a qualified MfP in 1998 via the NHC/D route, and started work at the maxillofacial dept. in Bedford hospital that year. In 2000, he accepted a maternity cover appointment at Queen Victoria Hospital in East Grinstead Hospital, and he became a permanent member of staff in 2001. In 2010, Barry completed the taught MSc at Kings College London. He then went on to become deputy head of Dept. at the QVH following the retirement of Terry Sharpe. Barry's particular interests in the maxillofacial world are ocular prosthetics and cranioplasty construction.

Mr Stefan Edmondson

Stefan Edmondson graduated from the University of Wales institute Cardiff with BSc (Hons) in Dental Technology. He then later worked at the Heath Dental Hospital from where he later moved to Birmingham to pursue his career in Maxillofacial Prosthetics where he has been for 24 years and is now Head of Service. Stefan has been fortunate to represent the IMPT and profession far and wide. Stefan is a Fellow of the IMPT and is registered with the HCPC and AHCS as a Consultant Clinical Scientist (Reconstructive Science).

Stefan's main areas of interest are Facial prosthetics associated with Head and Neck Oncology, carbon vibre sports splinting for facial sporting injuries, 3D surgical planning associated with patient specific implantable devices and 3D printing.

Professor Dominic Eggbeer

Professor Dominic Eggbeer bridges the gap between design and healthcare. At Cardiff Metropolitan University, he harnesses user-centred design and cutting-edge technology to revolutionise healthcare delivery. His research, woven into master's teaching modules and commercial services, impacts UK hospitals and beyond. With a Queen's Anniversary Prize and extensive publications under his belt, he champions collaboration and inclusivity, ensuring his innovations benefit diverse healthcare systems worldwide. Beyond accolades, Dominic finds joy in working with passionate colleagues, sharing his knowledge, and witnessing the positive impact of his designs on people's lives.

Dr Raelene Sambrook

Raelene is an Associate Professor in Prosthodontics at the Eastman Dental Institute (London). She is the programme director for the MSc Conservative Dentistry programme and deputy programme director for the MClinDent Prosthodontics (advanced training) programme. She also is an Honorary consultant at the Eastman Dental Hospital and works in private practice.

She graduated from the University of Queensland Dental school in 2000 and completed her Prosthodontics training at the University of Melbourne (Australia) in 2011. In 2017 she completed an executive MBA at the University of Lausanne (Switzerland). Her research interests are in ceramic materials, OHRQoL and smile design.

Schottlander oral presentation abstracts

The IMPRESSeD Study: Improving facial prosthesis construction with contactless scanning and digital workflow

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Background: Digital technology could help support the manufacture of facial prostheses. Three-dimensional morphable face models (3DMFMs)) are generative models for face shape and appearance which could provide a semi-automated and statistically meaningful way of designing facial prostheses. A systematic review of the evidence base identified limited clinical research investigating patient experience, treatment outcomes, or resource use with digital manufacturing of facial prostheses.

Purpose: A translational research project explored the impact of digital manufacturing on facial prosthesis production by using basic science, patient orientated, and early population-based research.

Methods:

1. A preclinical laboratory evaluation explored the trueness and repeatability of different methods of designing facial prostheses. Volunteers were scanned and their meshes were edited to remove a facial feature. Facial prostheses were designed using 3DMFM, traditional computer-aided design (CAD), and conventional manual sculpting techniques. Designs were repeated for 2 participants. The mean absolute error (MAE) was calculated between the prosthesis prototypes and the unedited facial features.
2. A feasibility crossover randomised controlled trial (RCT) evaluated the feasibility of delivering a definitive RCT of the clinical and cost-effectiveness of digital versus conventional manufacturing of orbital and nasal prostheses. The digital manufacturing process involved structured light scanning, CAD using 3DMFMs, and 3D printing of prosthesis replicas. Data was collected on patient preference, quality of life, and costs from the healthcare perspective. A qualitative substudy explored patients' experiences, preferences for manufacturing processes, and process utility.
3. An early-stage health economic model of the cost effectiveness of digital manufacturing of facial prostheses was developed. A service evaluation collected data on the flow of patients through the maxillofacial prosthetic service. A Discrete Event Simulation model was created in simulation software and populated with the best available evidence.

Results:

1. The preclinical laboratory study recruited 15 volunteers. The 3DMFM approach had greater trueness and repeatability shown by a low MAE compared with the other design methods.
2. The feasibility RCT recruited 15 participants and had a 27% attrition rate. Forty-five percent of participants preferred the digitally manufactured facial prostheses

compared with 27% who preferred the conventionally manufactured prostheses. The qualitative substudy recruited 10 participants. Most participants (90%) preferred the digital manufacturing processes. Participants were on average willing to trade off a 3 month wait to commence treatment if it meant they could undergo the digital manufacturing processes.

3. The early health technology assessment found the Incremental Cost Effectiveness Ratio was £989 per Quality Adjusted Life Year (QALY). The Incremental Net Health Benefit was 0.28 QALYs indicating population health could be increased from adopting the digital manufacturing approach. As the evidence base is scarce, the health economic model parameters and outputs are surrounded by considerable uncertainty.

Conclusion: A definitive RCT with health economic evaluation and qualitative substudy would be feasible to deliver. Further health economic analysis is needed to identify future research priorities. Public engagement activities have been co-developed with patients, artists, clinicians, and researchers to disseminate research findings and share the lived experience of people with facial prostheses. Arts exhibition based dissemination events are planned in 2024.

Acknowledgements: The research was conducted during my PhD. Professor Brian Nattress, Professor Andrew Keeling, Professor Chris Bojke, and Professor Sue Pavitt were my PhD supervisors. Professor Trevor Coward collaborated throughout all stages of the project. Further collaborations were made with a broad range of stakeholders including patients and the public, clinicians and scientists from multi-professional backgrounds, and creative arts and design professionals. Details of my own contributions and the contribution of supervisors/collaborators will be given during the presentation.

Funding: The principal funding for the IMPRESSeD study is from a National Institute for Health and Care Research (NIHR) Doctoral Fellowship. Additional funding support was provided by Leeds Hospitals Charity and Research England's Enhancing Research Culture Scheme. The views expressed in this abstract and related presentation are those of the author(s) and not necessarily those of the NIHR, other funders, NHS or the UK Department of Health and Social Care. The funding sources had no influence in the conduct of the project, writing of the reports, or the decision to submit the abstract for presentation.

A deep learning model for the evaluation of tooth wear

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Objectives: Deep learning methodologies are increasingly being used within all fields of dentistry to help provide valuable support to clinicians with their daily diagnostic activities. We propose a clinical decision support system (CDSS) that can assist clinicians in accurately providing appropriate preventive, interceptive and restorative treatment approaches for managing patients experiencing tooth wear.

Methods: The CDSS is based on the Tooth Wear Evaluation System 2.0 (TWES 2.0) and strategically leverages the capabilities of 3D models.

In this study, we aimed to focus on the development of a proof-of-concept that evaluated different levels of hard tissue loss on dental typodont models. This consisted of three parts: tooth segmentation, tooth wear evaluation, and treatment strategy suggestion. This paper primarily focused on the tooth wear evaluation algorithm. The core of this algorithm is the PointNet deep learning architecture which is specialised for extracting features from 3D models represented as point clouds.

Results: We trained the model on 4626-point cloud models labelled from 0 to 5 based on TWES 2.0 signifying the severity of tooth wear present. These models were obtained from typodont teeth using an intraoral scanner (IOS). We divided the data into a 8:2 training-test split. It achieves a Mean Squared Error (MSE) of 0.1371. The Mean Absolute Error is maintained around 0.3 and the coefficient of determination is kept above 0.8. Lastly, the average accuracy of the model after 100 epochs is 0.9140. This performs significantly better than other existing methods aiming to perform similar tasks such as K-Nearest Neighbour (KNN) and Support Vector Machine (SVM), achieving 43.4% and 23.4% higher accuracy, respectively.

Conclusions: The model achieved promising outcomes in comparison to other similar approaches. It alludes to the possibility that the proposed CDSS is capable of providing accurate values for the evaluation of tooth wear. Emphasising the need for continued exploration, the study advocates for further evaluation across diverse clinical presentations. This will help to facilitate informed implementation for broader clinical use. To our knowledge, this is the first attempt to use 3D modelling for evaluating tooth wear using deep learning.

Clinical Significance: This paper presents the first steps in attempting to develop a CDSS by using the TWES 2.0 system to correctly evaluate the severity of tooth wear. Correct tooth wear evaluation through artificial intelligence can lead to more accurate diagnosis and further development of preventive and therapeutic measures for this multi-factorial and important oral health problem.

The Impact of Airborne Particle Abrasion on the Surface Roughness and Flexural Strength of 4Y and 5Y Partially Stabilised Zirconias

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Statement of problem: Air particle abrasion (APA) is a common surface pre-treatment method that has been shown to enhance adhesion to 3 mol% yttria stabilised zirconia (3Y-TZP) by increasing the surface roughness without compromising its mechanical properties. The effectiveness of APA on 4 mol% and 5 mol% yttria containing zirconia's (4Y-PSZ and 5Y-PSZ) is still being explored, but the current literature suggests that this is a promising technique. However, there are concerns that this technique could

weaken the flexural strength of these materials. This is particularly consequential as these materials have reduced strength compared to 3Y-TZP. Existing studies have reported a decrease in flexural strength of 5Y-PSZ, while for 4Y-PSZ there may be an increase.

Aim: Assess the impact of low-pressure air particle abrasion on the surface roughness and flexural strength on 3Y-TZP, 4Y-PSZ and 5Y-PSZ disc specimens.

Materials and methods: Pre-sintered blocks of 3Y-TZP, 4Y-PSZ and 5Y-PSZ were milled into a total of 66 discs (11mm x 1.1mm). These were subsequently split into 2 subgroups; the control where discs were left as machined, and the experimental, where discs were treated with the same APA protocol (1 bar pressure, 50-micron particles). The surface roughness of all samples was assessed using a non-contact profilometer. One sample per group was randomly selected to be assessed under SEM. Biaxial flexural strength testing was carried out on the remaining 60 discs to assess their mechanical strength. Statistical analyses were carried out to determine if there were significant differences between the subgroups in terms of strength and surface roughness.

Results: The APA protocol increased the surface roughness of all groups, but this was only statistically significant for 3Y and 4Y. It did not significantly impact the biaxial flexural strength values of 3Y, 4Y and 5Y zirconia's, but there was a slight decrease in the mean for Group 3Y (1360.01 MPa to 1274.77 MPa), and a slight increase for Group 4Y (1004.98 MPa to 1034.13 MPa) and Group 5Y (732.18 MPa to 736.59 MPa). SEM analysis revealed that APA led to changes in surface topography for all types of zirconia, including increased surface texture, loss of grain structure on the surface, and presence of cracks and gouges. Notably, remnant alumina particles were seen on the 4Y-PSZ and 5Y-PSZ samples.

Conclusions: Based on the results and limitations of this study, the following conclusions can be made: 1) Low-pressure APA, increased the surface roughness of all groups of zirconia, but was only statistically significant for 3Y-TZP and 4Y-PSZ; 2) Low-pressure APA does not significantly affect the biaxial flexural strength of zirconia regardless of yttria content; 3) There is no correlation between the surface roughness and flexural strength of 3Y, 4Y and 5Y zirconia.

Schottlander poster presentation abstracts

Therapeutic effect of natural herbs in dentistry: A Narrative Review

SP01

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Objectives: Natural herbs have increased attention due to their therapeutic and general health-improving qualities as reported in the literature. This review paper aims to explore the therapeutic effects of natural herbs in dentistry and to describe the various herbal sources, active compounds and its dental applications. Methodology: A literature search was conducted using WoS, Pubmed, and Scopus with the search terms 'herbal' AND 'dentistry' AND 'alternative treatment'. Articles related to natural herbs and dental applications from the past 15 years until September 2023 were gathered. Inclusion criteria for this study was in-vitro experiments and clinical studies. Result: 512 articles were extracted from the search with 128 fell under the inclusion criteria (86 in-vitro experiments and 42 clinical studies). It was observed that 15 therapeutic properties were extensively examined, with antimicrobial studies being the most prevalent (50.0%), while the least explored properties were related to pulp-capping and obturation material (0.8%). Diseases such as denture stomatitis, oral candidiasis, gingivitis were highly reported to have benefited from natural herbal medicine as an alternative treatment option. Herbals such as Propolis, green tea, ginger, Zataria multiflora, chitosan, garlic, Artemisia, Schinus terebinthifolius Raddi, Uncaria tomentosa, Punica granatum, and Ricinus communis were found to be useful in the treatment of denture stomatitis. Rhizoma imperatae extract has been added to oral care products and showed excellent effect on reducing gingivitis. Pistacia atlantica extract mouthwash was reported to be effective against dental plaque bacteria and subgingival microorganisms. Conclusion: Numerous natural herbs have been extensively documented to have therapeutic effects in certain dental disease as supported by laboratory and clinical studies. However, comprehensive guide such as the clinical indications, therapeutic doses and application methods were with minimal evidence that can be derived from the literature. Thus, more extensive clinical trials are to be conducted on the therapeutic efficacy of natural herbs in dentistry.

Keywords: Natural product, traditional herbs, natural remedies, alternative medicine

Mind the Gap: Restorative Rehabilitation of a 20-Year-Old Patient with Multiple Primary Failure of Eruption (PFE)

SP02

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Background: Primary Failure of Eruption is a rare, non-syndromic eruption disorder characterised by failure of eruption of permanent teeth, which are not limited by

mechanical obstruction, ankylosis or difficulties with alveolar bone resorption. Affecting 0.06% of the population, this disorder can pose many challenges to the clinical team.

Clinical Case: This case discusses the management of a patient treated over a 10-year period, under the care of multiple specialties. Initially seen in 2012 as a 10-year-old with carious upper first molars, their unusual presentation of multiple unerupted teeth lead to a diagnosis of primary failure of eruption. Radiographically, 30 permanent teeth were identified with the eruption of molar and premolars being anticipated. The presentation was further complicated with impacted upper canines in a fairly high position, unusually positioned upper lateral incisors and impacted lower canines with cystic enlargement. Medically, the patient suffered from acquired hypothyroidism and Dandy Walker Malformation.

The patient was referred to Oral and Maxillofacial colleagues for the extraction of multiple teeth under general anaesthesia, leaving 24 permanent teeth spaced throughout the dentition. Lower unerupted teeth were left due to risk of pathological fracture to the mandible. Consequently, despite a prolonged course of fixed appliances and traction, there was failure to encourage eruption of buried teeth. The fruits of orthodontic intervention were diastema closure and aligned primary incisors, to maximise the space which could be used for restorative intervention. Most recently, this patient has entered the care of restorative to attempt rehabilitation of remaining gaps. In the first instance, the patient has been provided with upper and lower cobalt chrome dentures to establish stable, even bilateral occlusal contacts at an increased OVD. Patient is planned for Cone Beam CT scan with barium replica dentures to investigate suitability for potential implant retained prosthesis.

Discussion: This case highlights several interesting discussion points namely, the challenges that can be faced in the management of patients diagnosed with PFE. This diagnosis often precludes or complicates orthodontic treatment as traction can often result in ankylosis. The extraction of these teeth, in this case, carries high risk of pathological fracture of the mandible. As such, these untreated unerupted teeth complicate space planning for implant placement and subsequent rehabilitation. However, as this case proves, in the face of complex medical and dental history, removable prosthodontics should not be undervalued as they can offer solutions when other avenues remain fruitless.

Effect of Repeated Firing on the Topographical, Optical and Mechanical Properties of Fully Crystallized CAD/CAM Lithium Silicate-Based Ceramics

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Objective: The purpose of this in vitro study was to investigate the effect of different firing regimens on the surface roughness, gloss, Martens hardness, indentation

modulus, biaxial flexural strength and crystalline structure of fully crystallized CAD/CAM lithium silicate-based glass ceramics (LSC's)

Materials and Methods: Three fully crystallized CAD/CAM LSC blocks: Lithium disilicate (Initial LiSi Blocks; LS), zirconia-reinforced silicate (Celtra Duo; CD) and lithium aluminum disilicate (CEREC Tessera; CT) were evaluated (n=150). Specimens were allocated into five subgroups according to their firing protocol. Roughness (Sa) and gloss (GU) of the LSC's were measured with an optical noncontact profilometer (Talysurf CLI 1000, Taylor Hobson Precision) and a gloss meter (IG-331; Horiba), respectively. Martens hardness (HM) and indentation modulus (EIT) data were obtained from a hardness testing machine (Z2.5, ZwickRoell Ltd). The LSC crystalline phases and sizes were analysed by X-ray diffraction technique. Biaxial flexural strength (σ) of the LSC's was determined by the ball-on three balls (B3B) method in a universal testing machine (Z020, ZwickRoell Ltd.) Two-way ANOVA followed by Tukey HSD post hoc tests ($\alpha = 0.05$) was used to analyse the data.

Results: Statistically significant differences were found among the different treatment groups based on their Sa, GU, HM values ($p < 0.001$). CD displayed highest biaxial flexural strength and reliability after one firing cycle ($\sigma = 568.2$ MPa) while the least was associated with CT after two glaze cycles ($\sigma = 217.7$ MPa).

Conclusions: Type of material and firing regimens had a significant effect on the topographical, optical and mechanical properties of fully crystallized CAD/CAM LSC's. Glazing treatment significantly reduced the biaxial flexural strength and Marten hardness of the LSC's.

Can Improved Outcomes Be Demonstrated From Zirconia Wings of Resin Retained Cantilever Bridges When Compared With Metal Wings in vivo? - A Systematic Review

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Objectives: This systematic review was designed to assess if zirconia can be effectively used as a resin retained bridge framework when compared to non-precious metal frameworks in anterior cantilever resin retained bridges. The review paper set out to analyse the differences in restoration success and survival between each material type, whilst exploring the standard modes of failure and difficulties that clinicians may experience in providing these restorations.

Materials & Methods: A systematic literature search was undertaken using pre-determined inclusion and exclusion criteria. This review followed the Preferred Reporting Items for Systemic Reviews and Meta- Analysis statement (PRISMA) statement. Several databases were used to search for randomised control trials and longitudinal cohort studies which were published less than thirty years ago. A total of 54 studies met the predefined inclusion criteria. Abstracts and full-text articles were independently assessed by two reviewers, both reviewers identified the same final 6 articles for analysis. 4 studies reviewed the success, survival and failure characteristics of zirconia framework resin retained bridges, whilst 2 reviewed non-precious metal resin retained bridges.

Results: The analysis of the studies revealed an overall survival rate of 95.9% for zirconia-based restorations compared to 90.7% for non-precious metal frameworks. Non-precious metal resin retained bridges displayed a higher overall failure rate of 11.9% compared to 4.6% for zirconia-based restorations across the analysed papers. The most frequent complications were; wing debonding for the non-precious metal wing group, whereas substructure fracture and veneering ceramic fracture were more prevalent for the zirconia arm of the study.

Conclusion: Both types of resin retained bridge provide effective medium-to long term survival. Zirconia based frameworks will provide marginally increased success and survival, and greatly improved aesthetics. However, catastrophic failure is more likely with zirconia-based restorations. Non-precious metal is time tested and performs worse than its zirconia counterpart with regards to longevity, it does not exhibit the same framework fractures as zirconia. Cement choice and attention to the adhesive bonding systems used appear to be paramount to restoration longevity with both restoration subtypes. Furthermore, improved longevity can be seen when air particle abrasion is incorporated into the adhesive protocol. Within the limitations of this study, it has been determined that zirconia-based resin retained bridges can be effectively used in anterior cantilever bridges.

Cardiac-Restorative Interface: Are Patients with Acquired Cardiac Diseases Dentally Fit for Invasive Surgery?

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Introduction: Oral foci have been estimated to be the cause of 10-12% of infective endocarditis cases, with systemic bacteria exposure in periodontal disease being capable to eliciting atherosclerosis, coronary heart disease, and infective endocarditis. A particular concern for pre-surgical cardiac inpatients is whether the presence of oral diseases at the time of valve replacement surgery increases their risk of developing adverse surgical outcomes, including post-operative infective endocarditis. More than 8,000 cardiac valvular replacements are conducted annually in the United Kingdom, which highlights the large patient cohort who are at risk of developing post-operative infective endocarditis, which is a potentially fatal infection that has a 30-day crude mortality rate of 10.4%. The primary aim of this study was to identify the prevalence of dental disease in cardiac inpatients, and the secondary outcome was to evaluate the current referral pathway and dental treatment needs for these patients.

Method: Prospective observational data was collected from consecutive inpatient referrals from the Cardiology Team to the Restorative Dental Department at the Glenfield Hospital within University Hospitals Leicester NHS Trust between 15th September 2021- 6th July 2022. Three calibrated clinicians completed full medical and dental histories, clinical examination, and radiographs. A restorative consultant led treatment plan for each patient was devised, before liaising with Cardiology and Oral and Maxillofacial colleagues.

Results: A total of 53 referrals were made to the Restorative Department, with 41 meeting the eligibility criteria. Inpatients had a mean age of 63, ranging from 31-79. Reasons for needing cardiac surgery were infective endocarditis (5/41), infective endocarditis with valve replacement (4/41), valve replacement alone (25/41) and

valve replacement with coronary artery bypass graft (CABG) (7/41). 8/41 patients had experienced pain in the last year and 31/41 were irregular attenders to a general dental practitioner. 10/41 presented with active dental infection, 26/41 had caries and 21/41 had mobile teeth. Extractions were advised for 27/41 patients.

Discussion: At the point of diagnosis, preventative advice should be delivered to patients who have infective endocarditis and those who have acquired valvular disease that may require prosthetic valve placement. There was a high level of primary dental disease present within this patient cohort. Whilst American and European guidelines advise elimination of dental sepsis two weeks prior to cardiac surgery, there are no accepted standards relating to who is responsible for the dental assessments and the interventions required.

Conclusion: Collaboration between cardiologists, primary, and secondary care dental providers is essential for optimum patient care and minimisation of post-operative adverse outcomes. Additional guidance is required to ensure standardised service delivery, with an emphasis on supporting general dental practitioners to be able to provide regular dental check-ups and preventative advice to this high-risk patient cohort.

Effect of occlusal thickness on the fracture resistance of posterior milled nanoceramic crowns after thermomechanical aging

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Statement of problem: Fracture resistance is an important parameter to predict the performance of indirect dental restorations.

Purpose: The purpose of this in vitro study was to assess the influence of restoration occlusal thickness on the fracture load of posterior milled nanoceramic crowns, in comparison with the lithium disilicate crowns, after fatigue loading.

Material and methods: Forty test metal dies were fabricated by duplicating a master metal model consisting an anatomic abutment preparation of the maxillary first premolar, for a single crown. The dies were divided into 2 groups of 20 each for the fabrication of nanoceramic (Lava Ultimate) and lithium disilicate (IPS e.max CAD) single crowns. Each material group was further divided into 2 sub-groups of 10 each, based on the crown occlusal thickness, of 0.5-mm and 0.75-mm (n=10). Dental Type V stone dies poured from polyvinyl siloxane impressions of the test metal dies were laboratory scanned to design and mill 40 ceramic crowns. The crowns were cemented on to the test metal dies with a self-adhesive resin luting cement. All crowns were themocycled (2500 cycles) and mechanically loaded (250 000 cycles) in a mastication simulator, followed by static loading, until failure, and the values noted. The data were statistically analyzed by 2-way ANOVA and Tukey HSD post-hoc multiple comparison tests (α=.05).

Results: The mean fracture loads ranged from 1022 to 1322 N for nanoceramic, and 1145 to 1441 N for the lithium disilicate crowns. Two-way ANOVA revealed insignificant differences between the nanoceramic and lithium disilicate crowns (P>.05), in terms of fracture load. Significant differences were noted in the fracture resistance of crowns based on occlusal thickness (303 N; P=.013), regardless of material used. Multiple

comparisons by Tukey HSD post-hoc test showed insignificant differences between the 4 material-occlusal thickness groups (P>.05).

Conclusions: The nanoceramic crowns were found to be comparable with lithium disilicate crowns, in terms of fracture load. The mean fracture loads of all the tested crowns were within the normal physiological masticatory load limits.

Clinical Implications: Based on the fracture resistance results, nanoceramic crowns seem suitable for clinical use for the tested occlusal thicknesses.

Clinical Coding Audit

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Introduction: All patient interactions should be coded for department remuneration and as a record of completed treatment. In July 2023, new national codes were circulated for Restorative Dentistry as part of the Getting It Right First Time (GIRFT) initiative. Consistent coding is important for accurate payment and to ensure the department conforms to the national standards.

Aim: to complete a first cycle audit of the accuracy of coding in the Restorative Department

Objectives:

1. To assess if all completed treatment items were coded for correctly
2. To ensure the correct codes were introduced as per GIRFT update
3. To highlight the potential changes in payment for the department when using the new codes

Standards and criteria:The standard for this audit was that all items should be correctly coded for in 100% of patient interactions as per trust policy

Methodology:

- Sample size: 70
- Inclusion criteria: all patients seen on consecutive days within the Restorative department as seen in electronic diary
- Audit period: 01/03/2023-07/03/2023

Patients were identified using the inclusion criteria. Appointment clinical notes were compared to the recorded codes on the outcome form. This information was discussed with the finance team to ascertain payment.

Results: The majority of patient procedures (74.3%) had been coded correctly and a quarter coded incorrectly (25.7%). 24 patients would have new GIRFT codes for treatment completed (34.3%). Using the correct codes for all completed treatment items would have resulted in a £583.96 uplift for the department. The GIRFT codes would have increased remuneration by £31.43. The total payment increase could have been £615.38.

Conclusion: Coding accurately not only ensures measurement of case mix, but also fair remuneration. The introduction of GIRFT on Restorative Dentistry departments did not increase payment significantly.

Using CADCAM to facilitate reuse of milled bar components in implant supported overdentures whilst minimising patient impact: A case report

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Background: Milled gold bars (MGBs) may be used as an implant supported suprastructure to support a removable overdenture. Over time, overdentures supported by MGBs will become worn and will need refurbishment or replacement. The expense of producing MGBs and their matching sleeves creates a financial incentive to refurbish or reuse existing components. Refurbishment of MGB components typically requires the dentist and laboratory to produce a master cast onto which the bars can be placed to allow fabrication of a new denture. This leads to patients being left without their bars for a substantial period; for many patients, this means accepting several weeks without an adequate prosthesis. This poster outlines a case in which CADCAM methods have been used to alleviate this problem.

Case history: A 65-year-old female attended the University Dental Hospital of Manchester with maxillary and mandibular implant supported overdentures. In the maxilla, she had 2 MGBs supported on 6 Astra TX implants. In the mandible she had 4 Astra TX implants with locator abutments. Her existing dentures had substantial wear of the occlusal surfaces and had developed poor tissue fit following ridge resorption. She was unsatisfied with the retention, stability, and aesthetics of her current dentures. She worked in a client facing role and felt unable to be without her dentures.

Methods: Primary impressions were taken in impression putty in the maxilla and impression compound in the mandible. A polyether maxillary master pickup impression was taken to capture the milled gold bars in situ, alongside a mandibular closed tray locator pickup impression. The maxillary model was immediately cast by the laboratory with conventional uniabutment analogues. The MGBs were retrieved from impression and affixed to the models, before being scanned to an STL file using a 3D model scanner. After scanning, the bars were returned to the patient on the same day.

The STL file was then printed in high resolution with model resin using a Formlabs 3D printer. A verification jig was constructed from pattern resin and acrylic beams to verify the accuracy of the 3D printed model. Occlusal registration and try-in stages were performed with wax rims on styrene bases that had been adapted to fit around the bars. Following try in, a simple provisional acrylic maxillary denture was provided and modified chairside with ufigel to provide friction fit to the gold bars.

At this point the patients old dentures were taken, to allow the gold sleeves to be harvested. A copy impression was taken of the provisional denture and a wax try-in constructed. The harvested gold sleeves were integrated into the wax try-in using the 3D printed model to ensure correct orientation. Following successful try in the final denture was processed. The resulting maxillary denture demonstrated excellent retention and stability and required little occlusal adjustment.

Conclusion: Cost-effective refurbishment of previous implant rehabilitations will present as a growing need. This technique allows components of milled bar retained implant supported overdentures to be reused, whilst minimising the impact on patients.

Impact of Total Occlusal Convergence and Distance from an Adjacent Tooth on IOS Trueness and Precision of a Crown Preparation Finish Line: An In Vitro Study

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Purpose: This in-vitro study aimed to analyse the impact of total occlusal convergence (TOC) and distance between a crown preparation and adjacent teeth (DCAT) in the manikin's head, on IOS trueness and precision of finish line definition.

Materials and methods: Customised abutments with engaging connection of lower left first molar with TOC 10° and 30° with 1 mm chamfer finish line and 0.5 mm supragingival margin were designed and fabricated with 3D printed resin (CAD reference abutments). A sectioned printed mandibular jaw with a movable lower left second molar to create distances between the abutment and an adjacent tooth (0 and 1 mm) was modified to create an emergence profile for an implant abutment and fitting implant analogue. The abutments were hand tight and categorized into 4 groups according to TOC and DCAT as: Group A. TOC 10° DCAT 0 mm (T10D0), B. TOC 10° DCAT 1 mm (T10D1), C. TOC 30° DCAT 0 mm (T30D0), D. TOC 30° DCAT 1 mm (T30D1). Individual CAD reference abutments were scanned using a laboratory scanner with a high level of accuracy. Each CAD test model was scanned ten times in manikin's head to simulate the clinical setting with Trios 3 IOS. CAD reference abutment and CAD test model were superimposed and analysed using 3D analysis software. Root mean square values on distal finish line were measured for statistical analysis. Two-way ANOVA was performed to determine the significant differences and interaction effects of TOC and DCAT.

Results: Significant differences among different TOC and DCAT on IOS trueness of crown preparation finish line ($p < 0.0001$) but no significant differences for precision.

Conclusion: TOC and DCAT have an impact on the trueness of an IOS of an abutment finish line definition, but not for precision. Parallel TOC with reduced DCAT resulted in the lowest trueness.

Management of generalised tooth wear in a patient with limited posterior occlusion: A case report

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Introduction: Tooth wear is a multi-factorial process of complex aetiology, which may include attrition, erosion or abrasion. The condition can present with many concerns for the patient including sensitivity, failing restorations, aesthetic or functional issues. Treatment may be required depending upon the rate and amount of tooth wear, etiological factors, age of the patient, number of teeth involved and affected surfaces. Several management strategies can be considered for the management of tooth wear and consideration should be given to a minimally invasive approach whenever possible.

Background: This is a case report of the management of generalised tooth wear complicated by multiple missing posterior teeth. The patient was rehabilitated by reorganising the patient's occlusion at an increased vertical dimension. The treatment involved surgical crown lengthening, provision of direct and indirect restorations and removable partial dentures.

Case: A 44-year-old patient was referred to the Restorative Department at Edinburgh Dental Institute. He complained about the appearance of his worn-out teeth and generalised sensitivity. He had multiple missing teeth and suffered from functional issues due to these gaps. He was diagnosed with oesophagitis and depression, which were controlled with Amitriptyline, Duloxetine and Lansoprazole. His wear pattern and dentoalveolar compensation at the upper anterior segment had resulted in lack of restorative space. Hence, a reorganised approach was required.

The aims of the treatment were to improve aesthetics and function by replacing missing teeth, provision of canine-guided and mutually protected occlusion and provision of even bilateral posterior contacts.

- Stabilisation Phase
- Oral hygiene instruction and motivation
- Professional mechanical plaque removal
- Control of acid reflux through medications
- Root canal treatment on 15
- Pre-prosthetic face
- Recording of facebow-transfer for full analysis of occlusion
- Diagnostic wax-up and mock up
- Surgical crown lengthening (SCL) of 12,11,21
- Composite build-up 13, 12, 11, 21, 22, 23 after SCL
- Prosthetic
- Long-term provisional restorations (crowns) of 13, 12, 11, 21, 22, 23 after SCL
- Composite built-up 43, 42, 41, 31, 32, 33
- Replacement of the provisional restorations with lithium disilicate crowns on 13 12 11 21 22 23
- Fabrication of porcelain-fused-to-metal crown on 15, 14, 34 and 44 with milled surface and rest seat
- Composite build-up of (posterior U and L teeth)
- Fabrication of upper and lower cobalt-chrome dentures
- Maintenance
- Monitoring of restorations and diseases
- Delivery of Michigan splint to protect the restorations.

Conclusion: This case highlights the management of generalised tooth wear with prosthodontic-driven and multidisciplinary approach to optimise retention and resistance of prosthesis.

General Dental Practitioners' views of managing dental disease in adults who have been previously treated with head and neck radiotherapy

SP12

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Background: Head and Neck Cancer (HANC) accounts for 3% of cancers in the UK, with 8500 cases annually. The management may include a combination of surgery, chemotherapy or radiotherapy. General dental practitioners (GDPs) should be aware of the importance of effective prevention regimens for HANC patients following treatment. Patient management is normally transferred to the GDP for long term care, therefore GDPs play a vital role in these patients' care. Unfortunately, some patients report difficulties in accessing dental care with their GDP following treatment for HNC and are re-referred to secondary care teams with primary dental disease.

Aim: The aim of this study was to undertake a qualitative exploration of GDPs' views and experiences of managing dental disease in adult patients previously treated with head and neck radiotherapy.

Method: Participants were asked to take part in one semi-structured interview over the telephone or online lasting approximately 30 minutes. A total of 12 GDPs who provide routine general dental care in Northern Ireland were recruited initially via existing research networks.

The interviews explored the following using a topic guide: GDPs' existing knowledge and experience of providing dental management in adult patients who have previously received head and neck radiotherapy, perceived challenges in managing these patients, and the barriers and enablers for the management of dental disease in this adult patient group. The topic guide was piloted with two GDPs and amended accordingly to ensure face validity. All interviews were transcribed verbatim and coded.

Results: 12 GDPs completed the study as data saturation was reached at this point. A thematic analysis was carried out which revealed the following major themes: lack of appropriate renumeration in dealing with HANC patients; the complexity of managing HANC patients including disease prevalence; lack of confidence; lack of engagement by some patients with primary dental care. A number of GDPs discussed their reservation in prescribing large quantities of high fluoride toothpaste to HANC patients due to a fear of probity checks by regulators. Some GDPs also suggested that better communication with specialist services are required as they often receive very little information on their patients' treatment, prognosis and follow-up care.

Discussion: Understanding the challenges that GDPs face, is the first step in helping to reduce barriers and improve the quality of patient care post HANC treatment within primary care. Supporting GDPs to be able to manage these challenging cases may reduce the burden for patients, and reduce re-referral for management of primary dental disease.

Contour delineation and radiation dose extraction of select dentofacial structures

SP14

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Background and Aims: Select structures in the head and neck region are routinely contoured on radiotherapy CT scans in head and neck cancer (HNC) patients. This allows extraction of dose delivered to these structures and visualisation of their relation to the gross tumour volume (GTV) and clinical target volume (CTV) during radiotherapy planning. Dentists often liaise with radiation oncologists to request data on radiation dose delivered to the maxilla and mandible. However, depending on the contouring approach adopted at the radiotherapy unit, this data can provide limited information of the exact dose delivered to a region of the mouth. Furthermore, individual or groups of teeth are not routinely contoured preventing tooth dosimetry extraction and establishment of dose-effect relationships.

Methods: To establish existing knowledge and practices of contouring the maxilla, mandible and the teeth on CT radiotherapy planning scans in paediatric and adult HNC patients, a narrative literature review was conducted. A comprehensive literature search was completed in December 2023 using MEDLINE and EMBASE via Ovid, alongside the University of Manchester's (UoM) library and citation searching. With the findings of the literature review, teeth were manually delineated by a dentist with the support of a medical physicist on the planning CT scans (ARIA) for 5 patients treated with proton beam therapy (PBT) at The Christie NHS Foundation Trust. Following this, the results of this tooth contouring pilot and the literature review were fed back to the multidisciplinary working group 'SMILE' founded at the UoM and The Christie, to enable further development of the current 'dentofacial atlas'.

Results: The identification stage resulted in 827 records. 444 records remained following the removal of duplicates. 51 records remained after primary screening and 24 records were deemed relevant to the review following secondary (full text) screening. Despite 19 studies stating that teeth were contoured either individually or in groups, only one study delineated deciduous teeth. Furthermore, only 6 studies detailed their approach to tooth delineation. Although 11 studies reported that the mandible and/or maxilla were contoured for the purposes of radiation dose extraction, only five studies defined anatomical landmarks to be identified for contouring approach standardisation. The minor differences between studies identified in this literature review and the current dentofacial atlas established at The Christie were discussed within a multidisciplinary expert group.

The findings of the tooth contouring pilot will be discussed, alongside a schematic diagram outlining the anatomical landmarks identified and the delineation approach adopted.

Conclusions: Interdisciplinary collaboration in this contouring pilot and literature review were instrumental in establishing a standardised contouring approach to the maxilla, mandible, and teeth on CT scans. This approach will be adopted in a planned feasibility study, that aims to retrospectively collect dentofacial toxicity outcomes in a large cohort (n = >250) of UK paediatric HNC patients treated with PBT. To maximise

usability and reproducibility of findings in the planned feasibility study, this preliminary work is paramount.

Restorative management of a Royal Navy sailor presenting with peri-implantitis of the UR1 mini-implant and anterior acquired tooth loss

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This clinical case poster presentation demonstrates combined restorative management of a Royal Navy sailor referred for management of an upper right central incisor mini-implant which was placed abroad in the Caribbean. A 29-year-old, socially-smoking and medically fit and well male patient was diagnosed with the following: Peri-implantitis of an UR1 mini-implant, acquired tooth loss of the UR4, UL4 and LR1 and lower molars, discoloured composite and crown of a root filled UR1, discoloured composite UR2, generalised periodontitis – Stage II, Grade B, unstable, caries UR5 mesial surface, Miller's classification III recession defect LR2 and classification II defect LL1, LL2. Treatment provided and demonstrated within the clinical case poster includes stabilisation with oral hygiene instruction, dietary advice, caries management, replacement of anterior discoloured restorations, supra- and subgingival professional mechanical plaque removal PMPR to manage the periodontal disease and peri-implantitis, joint orthodontic – restorative MDT assessment, free gingival graft LR2, LL1, LL2, fixed – fixed resin bonded bridge to restore the increased LR1 space, endodontic re-treatment UL1 with new coronal restoration and management of the UR1 implant crown aesthetics. We will also discuss within the poster the future management of the UR4 and UL4 spaces with implant fixtures planned around a high tempo of military overseas deployments. This clinical case poster will discuss in more detail the eligibility criteria for implant management within the military, a review of the evidence surrounding mini-implants, digital diagnostic prosthodontic planning and implant planning for the acquired edentulous spaces.

Prosthodontic rehabilitation of a bilateral cleft lip and palate patient with residual fistulae utilising a sectional cobalt chrome partial denture design

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Introduction: Cleft lip and/or palate is the most frequent congenital craniofacial abnormality, with an incidence of approximately 1 per 700 births. Within the UK, fistula prevalence in such patients although reducing with innovations in surgical techniques, remains significant at 31.3%. This poster presentation describes the complexities associated with prosthodontic rehabilitation of bilateral cleft lip and palate patients with residual fistulae. Such fistulae, deep labial undercuts of the alveolus and frequently poor prognosis teeth proximal to the cleft site create challenges for prosthodontic rehabilitation. This poster presentation aims to share the successful management of these challenges with careful consideration of denture design, modified denture stages

and excellent communication with the laboratory technician to deliver a maxillary cobalt chrome, sectional partial denture.

Background: A 60-year-old male patient with a medical history of bilateral cleft lip and palate, was referred to the Restorative Department of the Eastman Dental Hospital to replace a failing maxillary partial denture. The 10-year-old denture had a sectional design with 4 split pins, one of which had fractured.

Maxillary lateral incisors were congenitally missing, and the only teeth requiring replacement. Three intra-oral fistulae, maxillary hard and soft tissue undercuts, and mobile maxillary central incisors required careful consideration during treatment planning. Deviation from conventional removable prosthesis fabrication stages was undertaken and included fistula protection during impressions, a two-part master impression technique and an altered wax tooth try-in on the denture framework. The final maxillary cobalt chrome tooth borne prosthesis was sectional in design with split pins.

Discussion: The sectional design with split pins enabled optimal aesthetics in replacement of anterior teeth, as well as for replacement in case of future loss of the maxillary centrals. The two paths of insertion allowed utilisation of labial undercuts and close enough adaptation to fistulae to prevent nasal regurgitation. When considering the edentulous space height and width, and the surrounding anatomy a swing lock design was not feasible nor were alternative precision attachments such as denture locators. Communication with the laboratory through written prescriptions, drawings and clinical photographs were vital in ensuring the fabrication of the highest specification special tray, cobalt chrome framework and acrylic sectional denture components.

Conclusion: The prosthodontic rehabilitation of edentulous spaces and associated fistulae in patients with bilateral cleft lip and palate requires careful consideration with often complex sectional partial denture designs. This presentation demonstrates the key stages of planning and fabricating such a prosthesis to ensure a successful outcome.

Pink & White? Novel 3D Printing of Complete Dentures

SP17

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The digital transformation of dentistry has been underway at a rapid pace within the last decade, with new and more sophisticated methodologies saving time and improving clinical outcomes. Fixed prosthodontics has been the main beneficiary, where advances in scanning and production of appliances have allowed laboratories to simplify manufacturing processes, moving to additive technologies, minimising both cost and waste. On the contrary, the development of digital workflow in removable prosthodontics has been slow until the more recent uptake in digital production of removable dentures and sintering of cobalt-chrome frameworks.

Studies have reported a superior fit of CAD/CAM dentures compared to those constructed with conventional techniques, which is likely related to reduced polymerisation shrinkage of PMMA. However, the requirements for multiple different

shades of materials have prevented the 3D printing/milling of removable prostheses without the structural disadvantage of bonding teeth to denture base or the aesthetic disadvantages of monolithic milled dentures. In order to overcome these limitations, more advanced 3D printing technology, which can manufacture acrylic denture bases and teeth without a need to lute the two components, is required. This would bring together advantages in surface hardness, flexural strength, dimensional stability, and aesthetics.

This presentation will present a case series highlighting the digital workflow for copy denture technique and dentures that have been 3D printed as a single unit utilising the novel technology.

The clinical workflow is simplified with the opportunity to proceed directly to fit. Following chairside scanning of the existing denture, the workflow is completed entirely digitally using CAD technologies. There are additional advantages of being able to copy the shape and size of existing teeth rather than rely on the moulds of available stock denture teeth. Additionally, through digital manipulations of the STL file, it is possible to replicate the patient's previous natural dentition more accurately.

The cases presented include post-radiotherapy oncology patients with limited mouth opening and altered anatomy secondary to surgery. The clinical outcomes from the cases have been favourable, with good aesthetics and fit. Significant clinical time has been saved with this technique.

In conclusion, the advances in 3D printing technology will have a profound impact on how removable prosthodontics will be practised in future. Within NHS hospitals, digital workflows can have significant cost benefits to the organisation.

Investigating factors that impact dental health pathways for Head and Neck Cancer patients- A novel research protocol

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SP18

Background: Head and neck cancer (HANC) constitutes a diverse group of malignancies affecting the oral cavity, throat, larynx, sinuses, and salivary glands, ranking as the seventh most prevalent cancer globally, with 660,000 new cases reported in 2021. Projected data anticipates a 33% increase in HANC incidence over the next 10-15 years. Despite the recognised importance of dental care in HANC survivorship, research indicates suboptimal engagement between HANC patients and dental care professionals (DCPs), leaving this population vulnerable to increased oral disease and life-threatening dental infections, with vital opportunities for disease prevention, treatment, and surveillance missed. Continued unchecked progression of dental disease often leads to the need for more radical treatment modalities that are both costly and carry a significant risk to patients.

Barriers to engagement remain poorly explored from both patient and professional perspectives. Addressing this gap is crucial for improving HANC patients' oral health, reducing disease burden, and preventing a decline in quality of life. Drawing on the patient's and clinician's experiences is key to identifying obstacles to engagement with dental care, with a goal to reduce disease burden and prevent any rapid decline

in quality of life. While several barriers have been hypothesised for this lack of engagement, this area remains poorly explored, and an effective intervention to overcome this challenge has yet to be developed.

Aims & Objectives:

- Explore the experiences and views of HANC patients' current dental care pathways, identifying any challenges and approaches used to overcome them.
- Investigate the perspectives of healthcare professionals (including GDPs) on the current dental care pathway for head and neck cancer patients and their role in facilitating appropriate and prompt dental care.
- Identify an effective intervention to improve current pathway structures and optimise the transition of care through the use of an Evidence-based Co-Design process.

Methods: The research plan comprises two work packages (WPs):

- WP1- A qualitative study utilising an established blended qualitative approach, leveraging non-participant observation and semi-structured interviews to capture data focusing on two key stages of the patient pathway: Pre-radiotherapy dental assessment and Post-treatment review. Data will be collected from patients and relevant healthcare professionals, ensuring broad representation of the multidisciplinary team as well as healthcare professionals within the primary care setting, such as Community dentists and General Dental Practitioners.
- WP2 - An Experience-Based Co-Design Process. Incorporating findings from WP1, an innovative and participatory research approach that involves collaboration between patients, healthcare professionals, and researchers will be utilised to identify and develop interventions designed to address common themes and issues within the HANC oral health pathway,

Anticipated Impact and Dissemination: The study aims to enhance understanding of the challenges in the HANC oral health pathway and develop practical, patient-centred interventions. Anticipated impacts include improved patient experiences, reduced oral disease burden, and enhanced quality of life. Findings will be disseminated through peer-reviewed publications, conferences, and collaborations with healthcare providers.

Management of a patient with deep traumatic overbite

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Deep overbite is defined as when the maxillary incisors overlap more than half of the clinical crown height of the mandibular incisor teeth (Mitchell, 2013). On occasions, the deep overbite may induce trauma to the soft and hard tissues, manifesting as inflammation and tooth wear (Akerly, 1977; McDonagh & Chadwick, 2004). Restorative rehabilitation is indicated especially when accompanied by tooth wear and tooth loss (Beddis et al, 2014).

This case report describes the multidisciplinary integrated management of a 60-year-old male partially dentate patient who had an Akerly class 2 incisal relationship. In addition to the traumatic overbite, the patient had multiple dental issues, including fractured tooth 21, impacted 23, endo-perio lesion in tooth 47, severe generalised

tooth wear, and high caries risk. The patient's history, clinical examination, and radiographic findings guided the formulation of a detailed treatment plan aimed at addressing both acute and chronic dental problems.

As an emergency measure, temporary stabilisation of tooth 21 was performed, followed later by extraction and provision of a cantilevered resin-bonded bridge. Concurrent root canal treatment and root surface debridement were carried out on tooth 47 to treat the endo-perio lesion. Orthodontic intervention was performed to extrude impacted tooth 23. The maxillary study cast was articulated using a face bow transfer record and the mandibular cast was articulated at a raised occlusal vertical dimension using a pre-contact retruded condylar position. A diagnostic wax-up was done and shown to the patient for his consent. The severely attrited mandibular anterior teeth were restored using direct resin composite restorations at a raised occlusal vertical dimension. Subsequently, a tooth-supported (Co-Cr) removable partial denture was constructed to replace the missing mandibular teeth.

It was decided not to replace tooth 26 considering patient concerns about treatment costs, and the low risk of axial movement of the adjacent teeth. Positive occlusal stops were built-up on the palatal aspect of maxillary incisors using resin composite restorative material with the aid of a putty index to enhance occlusal stability. Positive occlusal stops are important in preventing the recurrence of traumatic overbite (Beddis et al, 2014). Throughout the treatment process, patient education and awareness of oral hygiene practices, dietary modifications, and the importance of regular follow-up care were reinforced.

In conclusion, the interdisciplinary approach, involving endodontic, periodontal, orthodontic, and prosthodontic interventions, facilitated the successful management of the patient's complex dental conditions, leading to satisfactory outcomes and improved oral health. Regular monitoring and maintenance appointments ensured long-term stability and patient satisfaction. This case highlights the importance of comprehensive assessment, interdisciplinary collaboration, and patient-centered care in managing complex dental cases, particularly in older adults with multiple dental challenges.

Pragmatic Approach to a Restorative Conundrum following Dental Trauma in a Musician

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SP20

This case report explores prosthodontic rehabilitation of a 57-year-old gentleman who encountered dental trauma during his adolescence, leading to the loss of both upper lateral incisors and one central incisor. Despite relying on a well-fitting and retentive removable denture for an extended period of time, the patient expressed dissatisfaction with both the aesthetics and functionality of his current dental prosthetic. He is a driven musician and song producer and wished for a fixed and aesthetically pleasing solution that integrated into his artistic lifestyle.

The patient was originally referred to the department with regard to the UL1 which has caused intermittent pain for several years. The patient presented with acquired hypodontia affecting the upper right central incisor (UR1), upper right lateral incisor (UR2), upper left lateral incisor (UL2), and the lower left first molar (LL6) and lower

right first molar (LR6). Additionally, a chronic periapical abscess of the upper left central incisor (UL1) was diagnosed, necessitating primary endodontic treatment.

The primary endodontic treatment was provided and uneventful and the patient remained asymptomatic following completion. The pragmatic treatment plan involved implementing three resin-bonded bridges to address the missing upper incisors, with a strategic compromise regarding the bond to the UL1 following the endodontic treatment.

To enhance occlusal harmony and overall aesthetics, composite bonding was performed on the posterior dentition, increasing the occlusal vertical dimension and also ensuring a balanced and equalised occlusion. Direct composite has been used labially to further refine the aesthetics and achieve a natural, harmonious look to the UL1.

Throughout the treatment planning phase, the patient's overall lifestyle was considered. The focus was on delivering a prosthetic solution that seemingly integrated with his busy and artistic lifestyle. A bisque try-in was performed with the resin-bonded bridges to ensure correct size and palatal contour did not affect the patient's speech or singing ability prior to finalisation. The patient was actively involved in the treatment planning and evaluation processes to ensure a personalised and patient-centred approach to treatment, particularly due to the fixed prosthodontic options outside of implant treatment being limited in his case.

In conclusion, this case study demonstrates the successful application of a comprehensive prosthetic and restorative approach for a patient with trauma-induced acquired hypodontia in the upper anterior region. The integration of endodontic treatment, resin-bonded bridges, composite bonding, and a composite veneer addressed both functional and aesthetic concerns, providing the patient with a customised and enduring solution that harmonised with his social unique lifestyle as a musician and producer.

Slippy Skin and Lazy Bones: A 17-year follow-up of a prosthodontic rehabilitation

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Introduction: This case describes an 84-year-old patient who suffers from pemphigus vulgaris. It aims to share the long-term management of this patient who presented with a failing dentition and the additional complexities of prosthodontic rehabilitation posed by pemphigus vulgaris, and long-term corticosteroid use. It also aims to review issues associated with long-term bisphosphonate use and the risk of Medication Related Osteonecrosis of the Jaw (MRONJ).

Case summary and discussion: The patient initially had a mucosa-supported partial denture aggravating the oral pemphigus vulgaris lesions. Referred by Oral Medicine, she underwent full maxillary clearance in 2007, followed by placement of four 12mm implants (SP, SLActive ®, Straumann®) and attachment of a milled titanium bar (CAM StructSURE®, BIOMET 3i, USA) incorporating CEKA® attachments. Cast cobalt chrome frameworks were utilised in the maxilla and mandible.

Since then, maintenance spanning almost two decades has included repairs, bar replacements, and eventual denture replacements. In 2019, new upper complete and lower partial dentures were fitted. Subsequent reviews involved addressing defective restorations, bar replacement in 2021, and CEKA® attachment losses. More recently in 2023, the titanium bar was replaced, and the patient continues to be monitored by both the Restorative and Oral Medicine Departments.

Pemphigus vulgaris manifests as flaccid intraepithelial bullae, leading to painful ulcerations and erosions, primarily affecting mechanically irritated areas like the buccal mucosa. Autoantibodies binding to desmosomes result in suprabasilar cell separation, causing acantholysis and blister formation. The tissue fragility poses challenges in prosthodontic management and untreated pemphigus vulgaris can be fatal; thus, early diagnosis and treatment positively impacts prognosis.

The patient has been on prednisolone for nearly 30 years. Short-term glucocorticoid use rapidly decreases certain bone formation markers. Prolonged corticosteroid therapy is a risk factor for osteonecrosis of the jaw, affecting bone formation, osteoblast activity and increasing osteocyte lifespan. The patient also has a history of oral bisphosphonate use. Bisphosphonates suppress osteoclast action and result in increased bone density and a reduction in bone resorption. Guidance for dental management of patients on oral bisphosphonates doesn't rule out dental implants, but caution is advised, especially for those on bisphosphonates for prolonged periods and concurrently using steroids like prednisolone.

Conclusion: For patients with pemphigus vulgaris, prosthodontic rehabilitation is challenging, necessitating regular follow-up and maintenance with a multidisciplinary approach to ensure a successful outcome.

Bring your own device to class for dental CAD-CAM crown design

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SP22

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Introduction: In dentistry, digital technology has been applied in a wide range of areas, from diagnosis to treatment, and its use is increasing rapidly. There is growing need for dental schools to provide students more training on digital equipment to produce dentists for this changed environment. To establish a system for dental digital technology education, it is necessary to purchase multiple equipment and software in a large scale, however, the rapid development speed of this area renders this investment obsolete. Bring your own device (BYOD) is a method that uses students' personal devices in class to increase the efficiency of education while reducing the direct investment of the school. Therefore, it is often applied in general digital literacy education. However, with BYOD, users' computer specifications very widely, so it is important to know whether the computers are capable to perform the intended operation. Moreover, CAD-CAM programmes used in dentistry are mostly based on high-specification computers, it has been difficult to teach CAD-CAM in a BYOD method in prosthodontics education. Dankook University College of Dentistry had successfully conducted the practice class of making a crown using CAD-CAM in a BYOD method during the COVID-19 pandemic period. Based on that experience, in 2023, we introduced a web-based CAD program that is less affected by computer

specifications. The purpose of this presentation is to report the result of a survey on the computer specifications used by students and their experience using the programme.

Methods: Students were assigned a crown designing task, and tutorial videos and hand-outs were distributed. A web-based CAD programme (Dentibird Crown, Imagoworks Inc, Seoul, Korea) was used for crown designing procedure. All the designed crowns were produced with 3-D metal printer and returned to the students for crown adaptation practice. At the end of the school term, a survey was conducted on the specification of the computers used and the students' experience.

Results: A total of 63 students participated in the survey. 96.8% of the students used their own computers, and 100% of respondents successfully completed the designing task without any problem. The operating system of the computer was 81% based on MS Windows, and most computers were equipped with Intel 3i or higher CPUs and more than 4GB of memory. For the graphics processing unit, 51.6% was on-board graphics chipset. Seventy-two percent of students were satisfied with their experience.

Conclusion: BYOD method allowed student more experience without time and space limitations. Web-based programmes reduced the constrains on computer specifications. It is expected that this combination can be used in more diverse fields of dental education in the future.

Effect of ultrasonic cleaner combined with denture cleanser on removable denture microbiome in community-dwelling elderly: a randomized controlled clinical trial

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Background: The growing population of older adults wearing removable dentures necessitates effective strategies for maintaining optimal denture hygiene. The complexity of microbiomes on unclean dentures and the potential microbial infection risks associated with insufficient hygiene are largely underexplored, particularly through metagenomic sequencing technology. Therefore, it is crucial to overcome the denture cleaning challenges faced by older adults, who often have medical complications, reduced manual dexterity, and are at risk of oral and systemic infections.

Objective: This study primarily evaluates the changes in removable denture microbiomes and the Microbial Index of Pathogenic Bacteria after a 3-month intervention using a portable self-operated ultrasonic cleaner combined with an enzymatic peroxide-based denture cleanser solution (intervention group), compared to a control group (immersion in denture cleanser solution followed by conventional brushing).

Materials and Methods: A prospective, open-label, single-blind, block-randomized, parallel-arm, controlled clinical trial was conducted over three months, involving 56 community-dwelling elders wearing removable complete or extensive partial acrylic dentures. They were block-randomized into two denture cleaning groups: i) intervention and ii) control, and denture plaque samples were collected at baseline

and after 3 months. Type IIB Restriction-site Associated DNA for Microbiome metagenomic sequencing was used to characterize the species-resolved microbial composition for denture plaque at baseline and after interventions. The Microbial Index of Pathogenic Bacteria was measured by the sum of the relative abundance of pathogenic bacteria in a microbiome.

Results: Baseline sociodemographic factors, clinical factors, and microbial diversity for both groups showed no statistically significant difference ($P>0.05$). The intervention and control groups demonstrated a statistically significant reduction in overall microbial richness (Chao 1 index; $P<0.05$). The beta diversity analysis, using the Jaccard qualitative distance matrix, revealed significant differences in microbial community structures within both the intervention and control groups before and after the interventions. This finding was confirmed by the Permanova test, with $R2 = 0.077$, $P<0.001$ for the intervention group and $R2 = 0.056$, $P<0.001$ for the control group, respectively. The intervention group showed a significant decrease in overall microbial richness compared to the control group (Chao 1 index; $P=0.03$) after 3 months of intervention. However, the beta diversity, based on the Jaccard distance matrix, showed no significant difference between the two groups ($P=0.679$). In addition, the Microbial Index was significantly reduced in the intervention group ($P=0.029$), while no significant changes were found in the control group ($P=0.283$). There were no significant differences in changes in the index between the two groups ($P=0.497$).

Conclusions: Denture biofilm samples after ultrasonic cleaning with chemical cleanser intervention harbour ecologically less complex and less anaerobic biofilms while reducing pathogenic microbiome. The combination of antimicrobial therapy, in addition to ultrasonic cleaning, affected both the microbial community composition and the abundance of opportunistic pathogens in 3 months, resulting in a less pathogenic removable denture biofilm.

Management of Severe Toothwear

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Background: This case demonstrates a combination of using direct and indirect restorations as well as a removable partial denture to increase the patient's OVD and restore her dentition.

Clinical Case: A 80-year-old female presented with severe tooth wear, from a combination of attrition and erosion. Her presenting complain was sensitivity of her upper teeth which had been restored several times by her GDP but kept failing. She had a mild class III skeletal base and a long-standing cobalt chrome lower partial denture.

Following construction of initial study models, oral hygiene instruction and professional mechanical plaque removal a comprehensive treatment plan was established. Treatment commenced with freehand composite build ups of her lower anterior teeth. After surveying the cast, and denture design, rest seats were prepared for a new lower cobalt chrome denture. Secondary impressions and a centric relation jaw registration was taken including facebow records to facilitate a mock up to optimise tooth position. A wax up was simultaneously requested of the upper teeth at the final

increased occlusal vertical dimension. The wax up was tried in the mouth to assess the occlusion, aesthetics and any final adjustments required.

After the try in, direct composite build ups of UL3, UL1, UR1, UR2, UR3 and UR4 were completed by injection moulding technique. During the course of treatment, the patient attended with symptoms of reversible pulpitis from the UL4, which had extensive wear extending into the pulp. The tooth was extirpated for acute relief of pain. The root canal treatment was completed and a fibre post placed followed by an onlay to provide cuspal coverage. The lower cobalt chrome wax try in was re tried and final adjustments were made prior to the final fit. The UR4 was simultaneously prepared for a conventional cantilever bridge to replace the UR3. Finally, the patient was made a splint.

Conclusion: Carefully planned management of extensive tooth wear can preserve hard tissues, prolong the dentition, reduce treatment burden and most importantly improve the patient's quality of life.

The journey of a head and neck oncology patient from diagnosis to rehabilitation – A Case Report

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Introduction: Head and neck oncology incidence is increasing by 37% since the early 90s, currently 12,422 cases a year in the UK. 60% of the cases are diagnosed with a stage 4 tumour, it is expected that more patients will be requiring mayor reconstructions of their oral tissues and dentition.

History: In January 2022 a 58 year old male patient attended his GDP complaining of a loose upper molar for 2 years. Adjacent to the UR6, a white and red patch with raised margins prompted an urgent referral. The patient was an ex-smoker (10/day) with unremarkable medical history.

The oral medicine clinic performed an incisional biopsy that confirmed a well differentiated squamous cell carcinoma. The tumour was staged as T4a, N0, M0 The patient was partially dentated but the remaining teeth were periodontally involved (Generalised Periodontitis, Stage IV, Grade C , currently unstable).

The oncology multidisciplinary team decided surgical management. Implant supported complete dentures (ISCD) were recommended as his oral rehabilitation plan.

Treatment:

Maxillofacial Department:

- Low grade right side maxillectomy,
- Selective neck dissection Levels 1-4
- Reconstruction with a radial forearm free flap.
- Dental clearance.

Restorative Dentistry Department:

- First stage surgery: Implants were placed in the maxillan (UL2, UL3, UL4, UL5) and mandible (LR2, LL3) at time of resection surgery.

- Second stage surgery: Implants exposed under local anaesthesia by a mixture of H shaped flaps and biopsy punch where there was abundant keratinised tissue, healing abutments were fitted.
- Primary impressions: Impressions were taken with alginate and impression compound.
- Secondary impressions: Special trays were fabricated for open tray impression technique were subsequently trimmed and border moulded with green stick, impression taken with medium bodied polyether material.
- Centric Jaw relation (CJR) and Try in stages At CJR appointment a verifier acrylic bar was constructed over the fixture level models to check passive fit of the future bars. CJR and Try-in stages followed conventional complete denture principles.

Bar design and fabrication The articulated models with the try in wax bases were scanned using an Optical Blue Light scanner and the DTX studio software used to design the bars. Dolder macro bars were chosen, resilient for the mandible (allows for movement) and rigid for the maxilla (maximum retention) where there was no retention on the right side. The titanium bars were milled by the implant manufacturer.

IRCD fit (March/23) The screw retained bars were fitted and the access channels covered with PTFE tape and composite. The acrylic dentures housed gold riders on the fitting surface to engage on the bars. There was difficulty seating the lower denture despite trying to adjust the riders and acrylic. A pick up impression of the bar was taken to re-fit the gold riders.

Other treatments:

- Oral candidiasis confirmed by imprints treated with systemic Fluconazol.

Conclusion: The patient was delighted with his treatment, especially having a complete smile despite losing his right maxilla.

Oncology patients endure complex, often disfiguring treatments, that require long term management by a multidisciplinary team to provide the best possible quality of life.

Medium to Long term Solutions for Toothwear

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A case study looking at the medium to long term management of toothwear. The patient was seen over the course of 2 years and presented with a severe toothwear, fracturing teeth and missing gaps. The poster postulates the argument that composite is an excellent medium term solution and should be used to help the patient accommodate to a new occlusal vertical dimension in a re-organised approach. Overall a successful aesthetic result was achieved and the patient was able to improve their overall quality of life with the new upper and lower chrome dentures provided in addition to conversion of some of the composite build ups into full coverage crowns.

CAD/CAM Modified Window Immediate Partial Denture – a case report

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The use of immediate partial dentures, employing traditional analogue techniques, poses challenges in treatment planning due to difficulties in assessing proposed tooth position and occlusal analysis prior to tooth extraction. However, the advent of computer-aided design and manufacturing (CAD/CAM) technology has significantly transformed the planning and management of missing units in partially dentate patients.

In this case report, we present a unique fully digital CAD/CAM workflow for the treatment planning of an immediate partial denture using a modified window partial denture prosthesis approach. This innovative technique facilitated precise analysis of the proposed denture design, incorporating patient feedback and consent for the final extraction and fitting of the immediate prosthesis.

The subject of this report was a 57-year-old male who referred to the Restorative Department of University Dental Hospital Wales. He had multiple missing maxillary units due to progressive historical tooth loss and erosive tooth wear and suffered from Epidermolysis Bullosa. The patient's concerns included pain associated with the maxillary right permanent first molar (UR6), an ill-fitting maxillary partial denture contributing to soreness of his palate, compromised masticatory function due to malpositioned UR2, and psychological distress related to the poor appearance of his teeth.

Upon initial examination, a Kennedy 3 mod 1 maxillary arch was identified, with missing anterior units, palatally positioned UR2 causing tongue trauma during occlusion, previous endodontic treatment and symptomatic apical periodontitis associated with UR6, palatal ulceration associated with existing denture baseplate design, and generalized biofilm-induced gingivitis. Initial primary disease stabilisation was initiated to ensure optimal oral health, periodontal therapy, risk factor control, fluoride therapy, and endodontic retreatment of UR6.

Various oral rehabilitation options for the missing maxillary units were discussed, ranging from resin-retained bridges to partial dentures, implant-retained prostheses, or maintaining the status quo. Full arch digital scans were obtained, and denture design was performed in 2D before being recreated digitally using CAD software (Geomagic Freeform X). Digital analysis of occlusion and surveying was conducted revealing the impracticality of resin-bonded bridges due to tooth position and an unfavourable occlusal scheme.

A 3D printed resin mock-up of the proposed denture design was created as a windowed partial denture, allowing clinical assessment without extraction of UR2. This phase ensured patient evaluation of prosthesis aesthetics, tooth positioning, occlusion (static and dynamic), and opinions on whether to accept the position of UR2 or opt for extraction and coverage with a baseplate designed together with patient input to minimise mucosal trauma.

Final denture design, incorporating patient input, was fabricated as a windowed denture. After extracting UR2, the denture's intraoral position remained stable with no

reported issues of retention, extension, or stability. The baseplate was subsequently relined with elastomeric reline material. Post-extraction review indicated no problems reported and a new prosthesis will be created following full alveolar healing.

This case underscores the significance of immediate denture design using CAD/CAM technology. The utilisation of a 3D printed resin windowed partial denture allowed both the clinician and the patient to clinically evaluate the final immediate denture design before extraction, ensuring a successful clinical outcome.

A Three-Dimensional Analysis of Digital Impression Accuracy Derived from Three Intraoral Scanners for Partially Edentulous Maxillae

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Objectives: To compare the accuracy of maxillary partially edentulous impressions obtained from three different intraoral scanners: A three-dimensional analysis.

Methods: A highly accurate laboratory scanner was used to generate a reference digital stereolithographic (STL) file from a maxillary Kennedy class II resin model. The model was then scanned using three intraoral scanners (Primescan, Trios-3, Emerald) outputting thirty digital impressions (10 per scanner). Three-dimensional analysis software was used to evaluate accuracy (trueness and precision). To assess trueness, each digital impression was superimposed over the reference model STL. The STL with the highest trueness in each group was superimposed over each impression STL to evaluate precision. Colour maps were used to quantify deviations from the reference cast in five areas: total, palate, free-end, bounded saddles, and anterior teeth. Data were analyzed with two-way ANOVA with Tukey correction.

Results: Primescan showed the highest total area accuracy (3.7±4.22 μm, $p<0.05$) displaying highest trueness and precision in all areas except for the palate and anterior teeth. Emerald achieved the highest trueness and precision in the free-end saddle and palatal areas, respectively. Trios-3 had the highest bounded saddle trueness and anterior teeth precision. The three scanners showed significant differences ($p<0.05$) in accuracy in the evaluated areas and significantly higher deviations ($p<0.05$) within the palatal region (Primescan; 23.9±24.3 μm, Emerald; -44.8±-6.5 μm, and Trios-3; -49.9±-22.7 μm).

Conclusions: The three scanners showed the highest deviations in the palatal area. Therefore, it should be emphasized that scanning of the palate is accompanied with low levels of accuracy.

Clinical significance: The depth of the palatal vault should be considered by clinicians when preparing digital impressions. It is therefore necessary to employ other techniques to enhance the scanning quality of the IOS when palatal coverage is considered in the prosthesis design.

Keywords: Accuracy; Trueness; Precision; Intraoral scanner; 3D analysis; Superimposition; Partially edentulous; Maxillae; Digital impression.

Is early dental rehabilitation of fibula based reconstructions predictable in the malignant setting?

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Maxillofacial reconstruction following oncology surgery aims to restore form, function, and aesthetics. Over the past few decades, maxillofacial reconstruction has evolved with the use of vascularised free flaps. These flaps allow reconstruction of larger defects, maintenance of facial profile, and vascularised bone grafts can allow placement of dental implants to aid in rehabilitation. With flap survival rates over 90%, the use of dental implants in vascularised bone grafts has also increased and implant survival rates have been shown to be high. However, successful prosthetic rehabilitation of head and neck cancer patients has been less predictable. One solution to this may be reducing the time to rehabilitation.

The fibula free flap has become a common flap used in maxillofacial reconstruction and is often referred to as the “Workhorse” flap for mandibular reconstructions. Several techniques utilise the fibula free flap coupled with prosthodontically driven virtual surgical planning to increase the accuracy and predictability of implant placement for rehabilitation. Additionally, techniques like “Jaw in a day” are also beginning to be used in oncology cases to expedite patient’s rehabilitation.

Increasing data on these techniques is being published for both the maxilla and mandible with encouraging results. However, the low incidence of these cases makes large cohort studies difficult and maxillary and mandibular reconstructions are frequently pooled together. This is an issue, particularly when interpreting evidence concerning maxillary reconstructions. Not only are these cases rarer but the patients generally have a poorer long-term prognosis resulting in a higher attrition rate. Consequently, they make up a far smaller proportion of the evidence base than mandibular reconstructions but are generally considered equivalent to one another despite their marked differences technically and oncologically.

Defects in the maxilla are more variable with potential involvement of other key anatomical structures, such as the orbit and skull base. They are also more likely to present at a more advanced stage, undergo post-operative radiotherapy, and potentially have poorer survival rates. This makes them more unpredictable, creating increased complexities with virtual surgical planning, increases the likelihood of negative sequalae from implants or potential implant sites being irradiated, and makes the time to prosthetic restoration an even more important factor in successful rehabilitation.

The focus of this poster will be to discuss results of a literature review of the current evidence regarding implant-based fibula free flap reconstructions in head and neck cancer patients. Specifically focusing on time to rehabilitation and the disparity in the volume and quality of data for maxillary versus mandibular reconstructions.

Management of complications associated with suboptimally placed implants – replacing 10 year-old cement-retained implant crowns

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A 29-year-old patient was referred regarding peri-implant problems in the UR2 and UL2 sites. She complained of purulent discharge from the UR2 and UL2 gingival margins, with associated minor discomfort. The symptoms had been present for 18 months. The implants had been placed 10 years ago in an NHS hospital. She had been diagnosed with hypodontia, involving absent maxillary lateral incisors.

Examination revealed an average smile line, with the gingival margin of UL2 visible on smiling. The UR2 and UL2 implant crowns were cement-retained metal-ceramic crowns. There was inflammation of the surrounding soft tissues, increased periodontal probing depths of up to 7mm, as well as bleeding and suppuration on probing. There was no mobility of the UR2 and UL2. There were no abnormalities detected in the occlusal assessment. Intraoral radiographs showed a steep emergence angle of the implant crowns, but no peri-implant bone loss. A diagnosis of peri-implant mucositis of UR2 and UL2 was given.

Two courses of professional mechanical plaque removal were carried out, as well as oral hygiene instruction. This was followed by open-flap debridement and investigation of the implant. This revealed no residual cement, but did confirm the suboptimal emergence contours of the crowns. The two implant crowns were sectioned and removed. One gold screw was found to be damaged and required a slot to be placed in the screw head to remove it. Provisional screw-retained crowns were made and adjusted over time in order to improve the emergence profile of the crowns and monitor the soft tissue health. Once the soft tissues were healthy and the preferred emergence established, the provisional implant crowns were used to create a customised impression coping which was used in the final implant master impression. The final crowns were one-piece screw-retained titanium-composite crowns. Care was taken to use the same composite material for both laboratory fabrication of the crowns and clinically restoring the labial screw access holes to give the best aesthetic result, whilst still allowing retrievability should this be required in the future. Peri-implant health was achieved.

This case demonstrated some of the challenges associated with old crowns on suboptimally positioned implants, including screw access holes in the mid labial surface of the crowns. This technique outlined an alternative approach to the more traditional approach of cement retained restorations. It also reinforced new knowledge we have about implant-crown emergence, which was not understood to the same degree a decade ago.

Prosthodontic rehabilitation of a complex oncology patient – abandoned hope

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Aim: The aim of this case report is to outline the advanced prosthodontic principles, materials and methods utilised in a technically challenging case.

Patient Information: An 85-year-old male patient attended the Restorative Department at Oxford University Hospital, with a past history of squamous cell carcinoma of floor of mouth. Treatment involved resection of tumour, marginal rim resection and radiotherapy. Post treatment, the patient had several incapacitating sequelae including a speech impediment, the inability to masticate or swallow, no pharyngeal reflex and permanent peg feeding. Additional diagnoses included bullous pemphigoid, radiotherapy microstomia and scleroderma. The patient's ultimate wish was the reclamation of his oral functionality and dignity. Previous assessments by Specialists concluded that no viable treatment options would be available.

Examination: Upon examination, the patient had trismus, circum-oral scleroderma, and microstomia recorded at 27mm oral diameter, that restricted direct visualisation of the oral cavity. There was an overactive mentalis resulting in lower lip inversion and class III skeletal base with a prominent pogonion. He was edentulous with Cawood and Howell Class VI mandibular and maxillary ridges. There were no hamular notches, a lack of sulcus depth, highly friable and blistered soft tissues. The patient had no swallow reflex and could not lie back. An orthopantomogram evidenced unhealed sockets, remnants of retained roots, bony spicules, osteoradionecrosis of the mandible, and a previously repaired fractured mandible.

Treatment Plan: Considering his medical history, a surgical reconstruction was contraindicated. The patient consented to the construction of upper and lower acrylic complete dentures. Treatment limitations were outlined including difficulties in retaining the dentures and potential additional denture stages due to clinical complexities.

Method and materials: Modified stock trays were sectioned to capture a two-part preliminary impression of the maxilla and mandible using silicone putty. A further two-part sectional special tray with interlocking handles were subsequently used to record the denture bearing sites with greater accuracy complicated by his scleroderma/ microstomia. Temporary bases were fabricated to assess whether a two-part or single piece denture could be constructed. A neutral zone impression was taken to record the mentalis with visco-gel (soft tissue conditioner) and to guide tooth placement. The bases were further enhanced via alma wax extension and relined with visco-gel. Anterior and posterior tooth trials were conducted separately. A class III edge-to-edge incisor relationship with retroclined lower anterior dentition helped limit the mentalis displacement. The prostheses were successfully delivered after 9 appointments.

Discussion: This case had challenges from the outset, including visualisation of the oral cavity, compromised denture bearing anatomy, impaired resilience of soft tissues, and loss of integrity and competence of the velopharyngeal complex. Modified sectional impression techniques successfully used to overcome the microstomia. Rigid impression materials were used due to lack of pharyngeal reflex. Over time,

mouth opening exercise and frequent impression taking increased the elasticity of the microstomia circumference by 5mm.

Conclusion: The case showcases the successful prosthodontic rehabilitation post-oncological surgery, which had rendered the clinically complex patient with loss of all oral functions, dignity and quality of life.

Targeted Alveoloplasty

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Ectopic teeth are often deemed to be ankylosed following unsuccessful orthodontic traction in the absence of any obvious obstruction. These patients may have had extended orthodontic treatment periods with little or no progress with traction over several years. This 'impeded eruption' has occurred in the absence of primary and mechanical failure of eruption.

Corticotomies have been previously documented in the literature, with the primary aim of allowing rapid orthodontic movement of teeth and shortening treatment time. We propose a modified corticotomy technique termed 'Targeted Alveoloplasty' with the aim of disimpaction of the impacted ectopic teeth.

The 'Targeted Alveoloplasty' technique has been successfully trialled with several patients to enable orthodontic alignment. The cases involved surgical exposure guided by cone-beam computed tomography scans. Mucoperiosteal flaps were raised, and crowns of the impacted teeth were located. Piezo surgical bone removal tips assisted the controlled removal of bone to expose the maximum bulbosity of the crowns of unerupted teeth and teeth were subluxated. A bone channel was created with the piezo tips to act as a guided path for these impacted teeth to be orthodontically aligned into their desired position.

Multi-disciplinary team planning alongside orthodontic and paediatric colleagues ensured the careful execution of these surgeries with an orthodontically driven surgical approach.

The aim is to introduce this concept with a selection of case examples.

Lateral window osteotomy technique: a modernised approach to minimally invasive implant placement and predictable access to unerupted teeth

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Advances in digital workflow have allowed for the provision of custom-made bone-cutting guides using 3D planning compared to conventional techniques that rely on guesswork and are prone to inaccuracy and unpredictability. These cutting guides can be used in complex clinical situations where access to unerupted buried teeth may pose a risk of iatrogenic damage or injury to vital structures. In this report, a case comparison is made of surgeries carried out a decade apart using conventional versus

digitally planned approaches in which impacted teeth are accessed using a buccal window osteotomy technique to allow for sectioning and removal of the coronal aspect of teeth followed by placement of dental implants above the remaining root fragments.

A 39-year-old male seen in 2014 was diagnosed with amelogenesis imperfecta associated with multiple ankylosed and unerupted teeth with abnormal clinical crowns. Using a traditional CT scan, a buccal window was planned to access the ankylosed LL3 as it's apex lay close to the lower border of the mandible. The crown was removed, and an implant was placed immediately through the coronal aspect of the alveolar ridge. The buccal window allowed for sufficient access to remove the crown atraumatically with maximal retention of surrounding bone that led to predictable implant placement.

In 2024, similarly, a 49-year-old female was seen post 9 years of orthodontic treatment with multiple failed attempts to expose, bond and extrude LL3, LL4, and LL5. A CBCT revealed the likely cause was complex curved root anatomy and their proximity to the ID nerve posed a high risk for extraction. Therefore, it was decided to resect the apical third of the roots and plan for implants coronally. A digitally planned bone-cutting guide was made using specialised software to allow for accurate and minimally invasive access with the avoidance of iatrogenic damage in this high-risk area. Simultaneous guided bone regeneration and staged implant placement was then carried out.

Conventional crestal access, compared to the lateral window bone removal techniques, may lead to a significant amount of bone removal, involving more trauma and a prolonged healing period. A buccal approach facilitated by a 3D printed guide results in a minimally invasive method to preserve the coronal bone, which is critical in providing the option of simultaneous implant placement to aid primary stability or as a framework for guided bone regeneration. Continued developments in digital workflow should be optimised in modern care to provide predictable, efficient and atraumatic surgeries in complex cases where risks can be high.

A review of the quality of online information available for hypodontia patients

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Statement of problem: It is becoming increasingly common for patients to research medical or dental conditions and its management post-diagnosis. Studies have shown more than 70% of internet users will search online for healthcare information (Prestin, Vieux and Chou, 2015).

Hypodontia can be a complex condition for patients and their carers to research due to the individuality of the condition and the variability in recommended treatment modalities.

There is no standardisation or oversight with regards to the available healthcare information around hypodontia. Previous studies have raised concerns regarding the quality and readability of the available online information, though these studies were limited by the available assessment tools (Barber et al., 2018; Goodrum and Johal, 2023). More recently, assessment tools specifically aimed at assessing the quality of online content have been developed (Robillard et al., 2018).

Aims: The purpose of this research was to undertake a systematic online search, and utilise available assessment tools to assess the quality, readability, and content of available online information for hypodontia patients and their carers.

The outcomes of this research will be used to make recommendations to webpage producers for online content on hypodontia. Furthermore, these recommendations can be applied to developing online content for other dental conditions.

Materials and Methods: An online search was completed on Google for the questions: “What is hypodontia?” (Q1) and “What are the treatment options for hypodontia?” (Q2). PRISMA guidelines were followed and 100 webpages which met the inclusion criteria were assessed. In addition, targeted searches assessing the quality of online hypodontia information on NHS and official organisation websites was also carried out.

The webpages were assessed using a validated index (QUEST tool) to assess aspects including quality, bias, and reliability. Readability scores were obtained for each webpage using the Flesch-Kincaid readability assessment tool to determine how difficult the webpage was to read.

Targeted questions were also developed to assess the content of each webpage.

The results were collated, and statistical analysis was undertaken.

Results:

- The QUEST tool identified issues with authorship, attribution, conflict of interest, currency (date), complementarity and tone.
- The Flesch-Kincaid Readability assessment showed most websites were too complex for the general public to read.
- General dental practices were the biggest producers of online content for hypodontia though webpages were not personalised for individual patient severity.
- The US was the biggest producer of online hypodontia content (>50% of webpages).
- Most websites did not mention resin bonded bridges as a treatment modality and very few websites (22%) used photos/diagrams to illustrate treatment options.
- A high number of webpages were duplicates of each other and referenced no specific source.
- Most webpages from NHS and official organisations did not meet minimum standards.

Conclusion: As healthcare providers we have a responsibility to produce high-quality, readable literature for hypodontia patients and/or carers who deserve to be best-informed so they can make the most appropriate decisions.

The current quality of online information available is lacking across many domains. This project has made recommendations to current and future webpage producers.

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Impact of grinding and polishing on zirconia

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Statement of the problem: Grinding significantly increases roughness in zirconia ceramics and polishing using zirconia polishers has been recommended following such procedures. To date, different zirconia polishing systems exist with limited research supporting their effectiveness. Studies on the impact of polishing lack consistency in terms of protocols, number of steps and polishing times. Most of the research has been on 3 mol% yttria zirconia (3Y-TZP) and conflicting results have been reported on the polishability of zirconia ceramics with higher yttria content. Very little is known about efficacy and the impact of various available polishing systems on 4 mol% (4Y) and 5 mol% 5Y-PSZ.

Materials and methods: Fifty zirconia discs (11mm in diameter and 1.1 mm in thickness) of 4Y-PSZ (Zircostar UHT) and 5Y-PSZ (ArgenZ anterior super translucent) each, were fabricated and sintered following manufacturer's instructions. The samples were divided into five groups of 10 specimens for each zirconia. The Control (C) groups comprised the untreated, as-sintered specimens. All the remaining specimens were polished following laboratory polishing protocol, and 10 of each zirconia type were set aside as the finished group (F). The remaining specimens were then adjusted using a red fine grit (45µm) diamond bur of which, 10 of each were assigned to the adjusted group (A). The remaining specimens were randomly divided into two groups, namely (U) group for the specimens polished using the universal polishing system (OptraGloss ceramic kit) and (Z) group for the specimens polished with zirconia polishing system (Diatech ShapeGuard). All the groups were then analysed for surface roughness and biaxial flexural strength.

Results: As sintered specimens (C) are rough and laboratory polishing significantly reduced surface roughness. Adjusting with diamond bur significantly increased the surface roughness in both 4Y and 5Y PSZ. Hence the null hypothesis for the difference in surface roughness between the groups was rejected. While the polishing kits reduced surface roughness in both 4Y and 5Y-PSZ, the reduction was not significant for the Z group (Diatech zirconia polisher) for either 4Y or 5Y-PSZ. In contrast, the OptraGloss polishing kit significantly reduced surface roughness in 4Y-PSZ only. Hence the null hypothesis comparing the two polishing kits was rejected. Similarly, the null hypothesis for the difference in roughness between the two types of zirconia was rejected. No significant difference was noted in the flexural strength

between the groups of either type of zirconia, hence we could not reject the null hypotheses for flexural strength.

Conclusions: Zirconia specimens require polishing after production to reduce surface roughness. Furthermore, diamond bur adjustment increases roughness in both 4Y and 5Y-PSZ. Whilst polishing reduces roughness post-adjustment, the effectiveness of polishing systems may not be consistent across all zirconia types.

The results provide no evidence that grinding and finishing procedures significantly affect the flexural strength of either 4Y-PSZ and 5Y-PSZ.

The Return of the Telescopic Denture: A CADCAM Titanium Substructure Metal Denture retained with PEEK inserts

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Introduction: Developmental defects of the maxilla can leave patients with debilitating side effects including difficulty with eating and speaking, adversely affecting their quality of life. It has been reported that they can suffer 'clinical burnout' resulting in irregular attendance late in life. Post-closure removable options are fraught with issues due to post-surgical scarring. Treatment options for such defects include either surgical reconstruction or prosthetic obturation, each with their own indications, advantages and disadvantages.

Examination: A cleft patient was referred from a local cleft unit for dental rehabilitation whilst the team considered options for further surgery. The patient requested a removable upper prosthesis whilst he and his surgical team considered further surgical intervention. He had two non-vital upper canines and a poorly fitting bleached acrylic denture opposing a shortened dental arch. Periodontal health was poor with a diagnosis of Generalised Periodontitis Stage II Grade C (Risk: Biofilm).

Treatment Plan: Primary disease was stabilised with oral hygiene instruction, PMPR and treatment of the apical periodontitis. Intra-oral scans were performed, and tooth shape and form were tried using a tooth-supported coloured-printed PMMA denture. The patient was given this crown-retained PMMA denture as an interim measure.

The canines were minimally prepped for gold copings, with the parallel nature of the preps checked using intermittent intra-oral scans. Milled gold copings were placed, and the tooth bourne denture converted to fit the copings. A further intra-oral scan was completed and conversion denture fabricated copying tooth position but with some alteration to tooth form and colour. This provided not only function for the patient, but also confirmatory registration of the digital model and fabrication process.

After a final period of prosthesis alterations, a lab scan of the sterilised adjusted temporary denture was also completed, and the outcomes combined. A milled-titanium bar substructure was fabricated. After metal work try-in, composite facings were bonded to the titanium, and printed PEEK inserts luted into the titanium for friction fit retention.

Discussion: The first description of use of telescopic abutments for retention of a dentures was in 1886. This technique was further refined by our German counterparts Häupl, Böttger and Rehm, in the 1920's developing a method that remains almost

unchanged to this very day. This case marries several of the principles of the Haupl work with CADCAM principles.

From a patient perspective, this CAD-CAM method has reduced appointment time and frequency. It has also provided tooth retained options at an early juncture, allowing for the patient's wishes to be explored over time. This is all fabricated with intra-oral scans rather than conventional impressions, which have been shown to be preferred by patients.

The clinical team has been able to plan tooth position remotely and work with the patient as their aesthetic need has developed. With the ease of refabrication and alteration of PMMA, the extended trial period has been satisfactory for the patient and easily maintainable for the dentist.

From a support team perspective, laboratory time has been reduced, with alterations easy to provide (30 mins for digital file alteration, 24 hours of non-engaged reprint with 15 minute polish after completion and 15 minutes to re-colour).

It is unknown how the PEEK inserts will wear and how these will provide retention. While this has been accepted practice for implant-retained dentures for some time, it is still to be proven with telescopic gold abutments. At fit, the retention was excellent; time will tell how the wear of the inserts will proceed. However, with the ease of refabrication of the inserts, fracture resistant nature of titanium and composite, complications should be limited.

Digitally planned rehabilitation of the maxillectomy defect using a Semi - flexible framework – A Case report

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Introduction: Head and neck cancer is the eighth most common cancer in the UK accounting for 3% of all new cancer cases, and the sixth leading cancer by incidence worldwide. In the UK, 70% of the HNC cases are in males and 30% are in females. Surgery remains the mainstay for managing most neoplasms arising in the head and neck area. Removable/fixed prostheses are commonly used for prosthetic rehabilitation of head and neck defects following surgical resection. It is also important to note that the nature of the disease, requires close surveillance for several years, and patients who have undergone treatment may require rehabilitation and care on an ongoing basis. Some major challenges in prosthetic rehabilitation after maxillomandibular microvascular reconstruction include excessive prosthetic space, soft tissue bulk, and occlusal disharmony in the remaining dentition.

Background of the problem: This case discusses the treatment journey of an 81-year-old individual who underwent a maxillectomy and radiotherapy for Microinvasive Squamous Cell Carcinoma in the left maxillary antrum 25 years ago. Following the initial surgery and loss of the UL1-UL7 teeth, the patient experienced multiple post-operative complications that necessitated further corrective surgeries and reconstruction. Over the last 25 years, the patient's prosthetic rehabilitation involved Co-Cr Swinglock dentures, which required three remakes due to component failure and/or damage to retentive elements. The latest denture, being 12 years old, had undergone numerous repairs and was now providing inadequate retention and

function. Opting strongly against dental implants due to past surgical complications, the patient preferred a more conservative approach to restore function and appearance.

In this context, Polyoxymethylene (POM), also known as Acetal, a thermoplastic material known for its high stiffness and excellent dimensional stability, was used. This material has been used in dentistry for making partial denture frameworks, clasps, and temporary crowns/bridges. After a thorough dental assessment and necessary investigations, a semi-flexible framework material (Duracetal®) was employed for the patient's prosthetic rehabilitation and tooth replacement. The framework, digitally designed and milled, was carefully crafted to enhance retention, which significantly improved function, aesthetics, and the patient's overall quality of life. Alongside, a Conventional Co-Cr Removable Partial Denture (RPD) was fabricated for the missing mandibular teeth, aiding in achieving bilateral posterior occlusal contacts.

Conclusions: Careful consideration of patient wishes and treatment factors is mandatory whilst considering complex dental treatment

Every prosthesis has a survival time and this must be clearly conveyed to the patient as part of the consent process to enable patients to make decisions regarding their treatment options.

The main advantage of using this material lies in is its inherent stiffness, cost effectiveness and relatively straight forward planning which can be assessed prior to milling. The evidence of their success in head and neck cancer to restore large defects is somewhat limited.

Save the date...

Sustainability in Prosthodontics

The British Society of Prosthodontics 2025 Annual Conference on Thursday 3rd & Friday 4th of April 2025 at The Royal Institution of Great Britain in London

It is an honour and a privilege to be elected the BSSPD President for 2024-25, and it gives me great pleasure to invite you all to save the date for the BSSPD Conference in April 2025. The conference theme is 'Sustainability' and applies to a variety of our working lives:

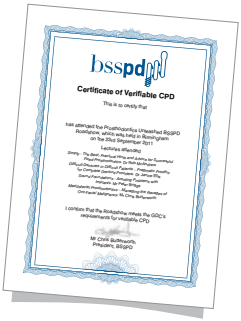
A great venue with a history of scientific endeavour has been booked in Central London to host this event. I look forward to welcoming you all to share this experience in Spring 2025!

Kind regards,
Shiyana Eliyas, President Elect, BSSPD

CPD certificates

This meeting will provide 12 hours of verifiable CPD in total (6 hours Thursday and 6 hours Friday). Delegates wishing to obtain CPD MUST sign in on both days to be awarded the hours allocated for that day.

Following the conference, delegates will receive an email containing a link to the conference on-line feedback form. Once this form has been completed, the CPD certificate can be downloaded.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